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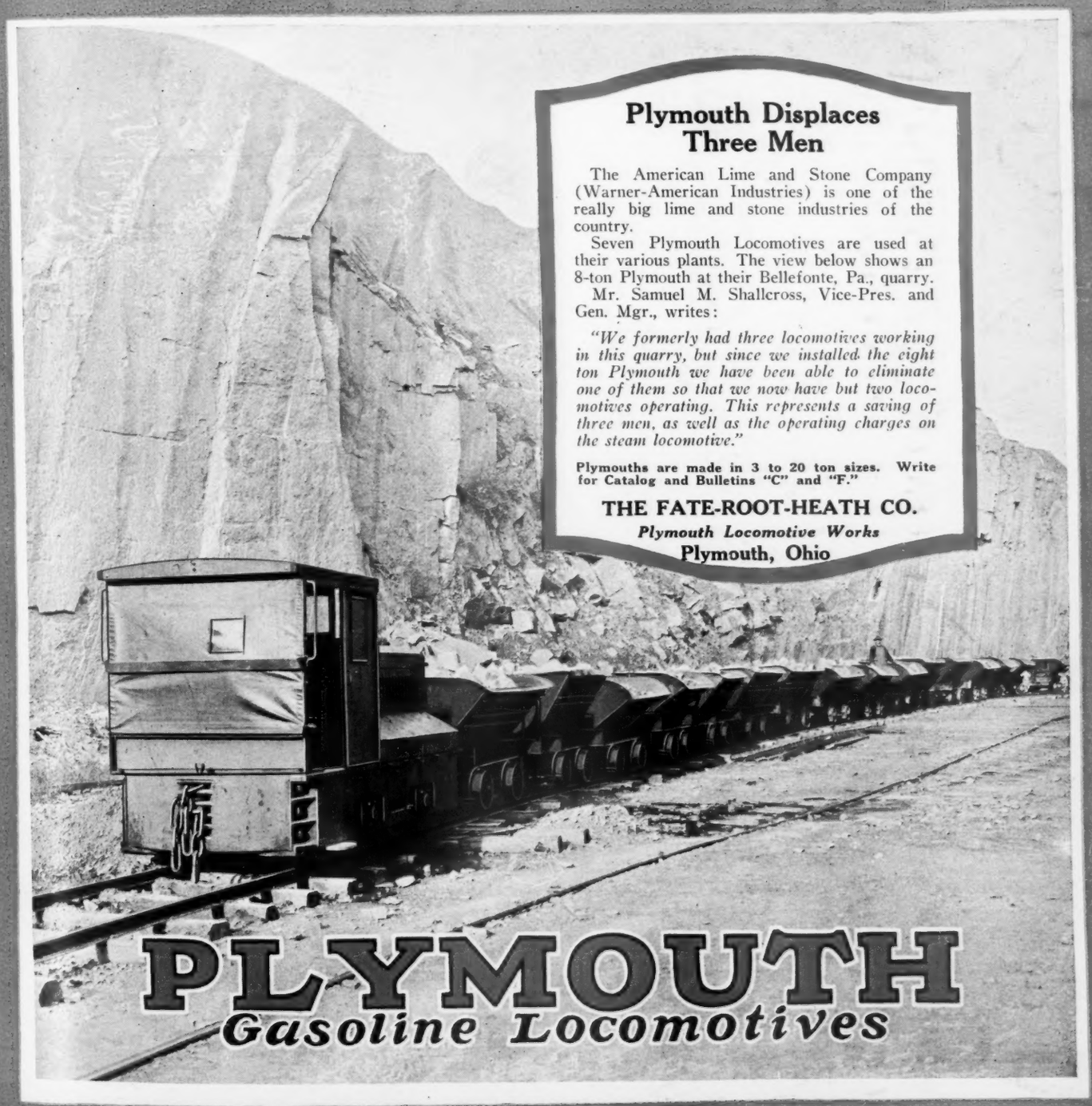
Rock Products

With which is Incorporated CEMENT and ENGINEERING NEWS Founded 1896

Chicago, February 20, 1926 (*Issued Every Other Week*) Volume XXIX, No. 4


Plymouth Displaces Three Men
The American Lime and Stone Company (Warner-American Industries) is one of the really big lime and stone industries of the country.
Seven Plymouth Locomotives are used at their various plants. The view below shows an 8-ton Plymouth at their Bellefonte, Pa., quarry.
Mr. Samuel M. Shallcross, Vice-Pres. and Gen. Mgr., writes:
"We formerly had three locomotives working in this quarry, but since we installed the eight ton Plymouth we have been able to eliminate one of them so that we now have but two locomotives operating. This represents a saving of three men, as well as the operating charges on the steam locomotive."
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Due to inadequate protection of grinding machinery a serious breakdown has resulted in the temporary cessation of operations
Supt.

SO instead of locking the barn door they shut down the plant—but they guard their grinders with a Dings now!

Dings "High Intensity" Magnetic Separators are not a luxury—they are a necessity. Like fire insurance on your plant they protect—protect your grinders and crushers from smashing tramp iron that mangles cores and teeth.

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Vol. XXIX Chicago, February 20, 1926 Number 4

A 50-Year Record in Crushed-Stone Production in the Chicago Territory

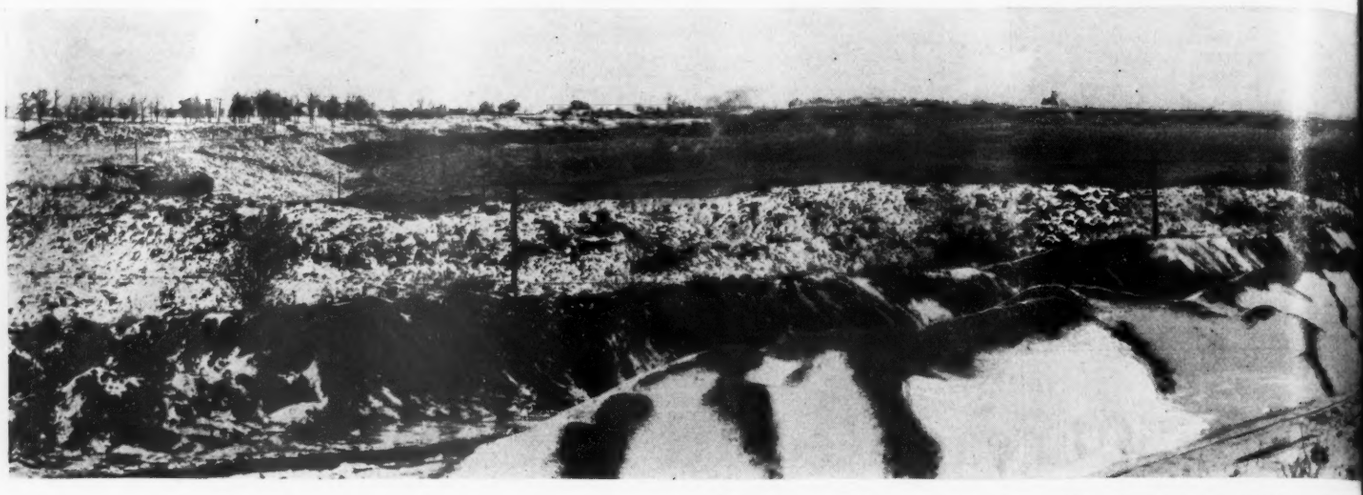
Dolese & Shepard Company Has Had a Long and Varied Career —Perhaps the Longest in the Crushed Stone Quarry Industry

By Gordon Smith
Secretary, J. C. Buckbee Co., Engineers, Chicago, Ill.

SELDOM in the history of modern industrial enterprise do we find a manufacturing plant that has stood unchanged for any great length of time. Improvements, changes, alterations in the product and the methods of its preparation, so leave their marks upon the original structure, that few builders of manufacturing plants could return after an absence of years and find their original schemes and ideas recognizable. Changing conditions and methods are the most frequent "wreckers" of industrial plants and there are few industries for whose products substitutes have not appeared in one form or another to make necessary vital changes in the original product and its method of production. New and less expensive methods and means, and the substitution of machinery for hand work have wrought their metamorphoses in the appearance and plans of industrial plants.

General view of the plant of the Dolese & Shepard Co. crushed-stone operation at Gary, Ill., near Chicago

It is unusual then to find in any industry a plant which has stood the test of sixteen years of operation and still looks the same, has the same method of operation and uses the same equipment—other than the parts replaced due to wear—as it did in the beginning. What is even more unusual is to find that plant still meeting in an efficient manner the demands of its market and still classed as a modern plant after its sixteen years of usefulness. Such a plant would certainly reflect great credit upon the foresight and abilities of those responsible for its conception and design. As an example of this rarely found industrial achievement, we



Panorama of the quarry and crushing plant of the Dolese & Shep

point to the stone crushing plant of the Dolese and Shepard Co. at Gary, Ill., built in 1908 and 1909 and showing a record of sixteen years of successful and continuous operation to date. This plant is now operating with the same equipment of machinery and buildings as in 1909, is efficiently meeting the demands of its 1925 market and is modern in every way.

History

A brief history of the company, its organization and its predecessors will be of interest.

In 1868 a partnership composed of John Dolese and Frank Shepard engaged in the quarrying and crushing of limestone from a quarry which they owned near Hawthorne, Ill., under the name of "Dolese and Shepard." The property they owned is located along both sides of Cicero Avenue (48th) between 30th and 33rd streets, the quarry opening being on the east side of Cicero, and comprises slightly over 75 acres. The output of the so-called Hawthorne quarry was chiefly used for fluxing purposes and the building of macadam roads and streets.

The partnership must have prospered because shortly after the beginning of the present century, two other quarry properties were acquired at McCook and Gary, Ill. By this time also the partners had two plants in operation at the Hawthorne property, one having a No. 8 gyratory crusher as its primary breaker and the other a No. 7½. The McCook quarry boasted a No. 8 initial crusher and the Gary, or Hodgkins, plant had only a No. 6 primary.

In 1902, T. P. Phillips, then president of the Naperville Stone Co. of Naperville, Ill., became interested in the business of "Dolese and Shepard" and in that year a corporation was organized under the laws of Illinois to acquire the properties and business of the partnership under the name of the Dolese and Shepard Co. Of this new corporation, T. P. Phillips was president and treasurer, W. E. Phillips was vice-president and general manager, and Henry Martin, secretary.

From 1902 until 1905, the Hawthorne quarry with its two crushing plants, was the major source of supply of stone although operations continued without interruption at the other two quarries. In 1906, however, the major operations of the company were transferred to the Gary quarry with the construction and placing in operation of a new crushing plant there, which had a No. 9 gyratory crusher as the primary breaker and two No. 6 and two No. 4 secondary crushers. This new plant operated only until the summer of 1908, when it was destroyed by fire. During the period from 1906 to 1908, operations were continued at all three quarries, but, as stated before, the principal source of material was now the Gary property. During this same period hand loading methods in the quarry were abandoned in favor of steam shovels, the latter method having been continued without change, other than the installation of additional equipment, down to the present time.

At this time the company was also engaged in the lime business at the Hawthorne

Control tower for the electric haulage system

Another quarry view showing two levels of operation

at Gary, Ill., within the switching zone of the city of Chicago

quarry and operated there a battery of twelve shaft kilns. This business was carried on until 1915, when the company retired from this field altogether. The lime burned was marketed under the name of "Hawthorne White Lime," which was a very popular and well-known brand.

In 1908, immediately after the fire which destroyed the No. 9 plant at Gary, the J. C. Buckbee Co., engineers, of Chicago, was employed to design and build a new and modern crushing plant to replace that destroyed; the new plant to have sufficient capacity to permit the abandoning of operations at the other two quarries. This new plant, shortly to be described, was completed and put in operation in 1909 and has since been in continuous service, unchanged except for ordinary renewals and replacements.

Various changes in the personnel of the Dolese and Shepard Co. have occurred from its organization in 1902 to the present time. In 1909, T. P. Phillips retired from active participation in the company's affairs and W. E. Phillips was made president and treasurer, E. J. Cady, vice-president, Henry Martin remaining as secretary. In 1910, J. F. Talbot and G. R. Thompson, formerly of the Dennison Manufacturing Co., were called into the organization as president and secretary, respectively, Messrs. Cady and Martin retiring and W. E. Phillips resuming his former office as vice-president and general manager.

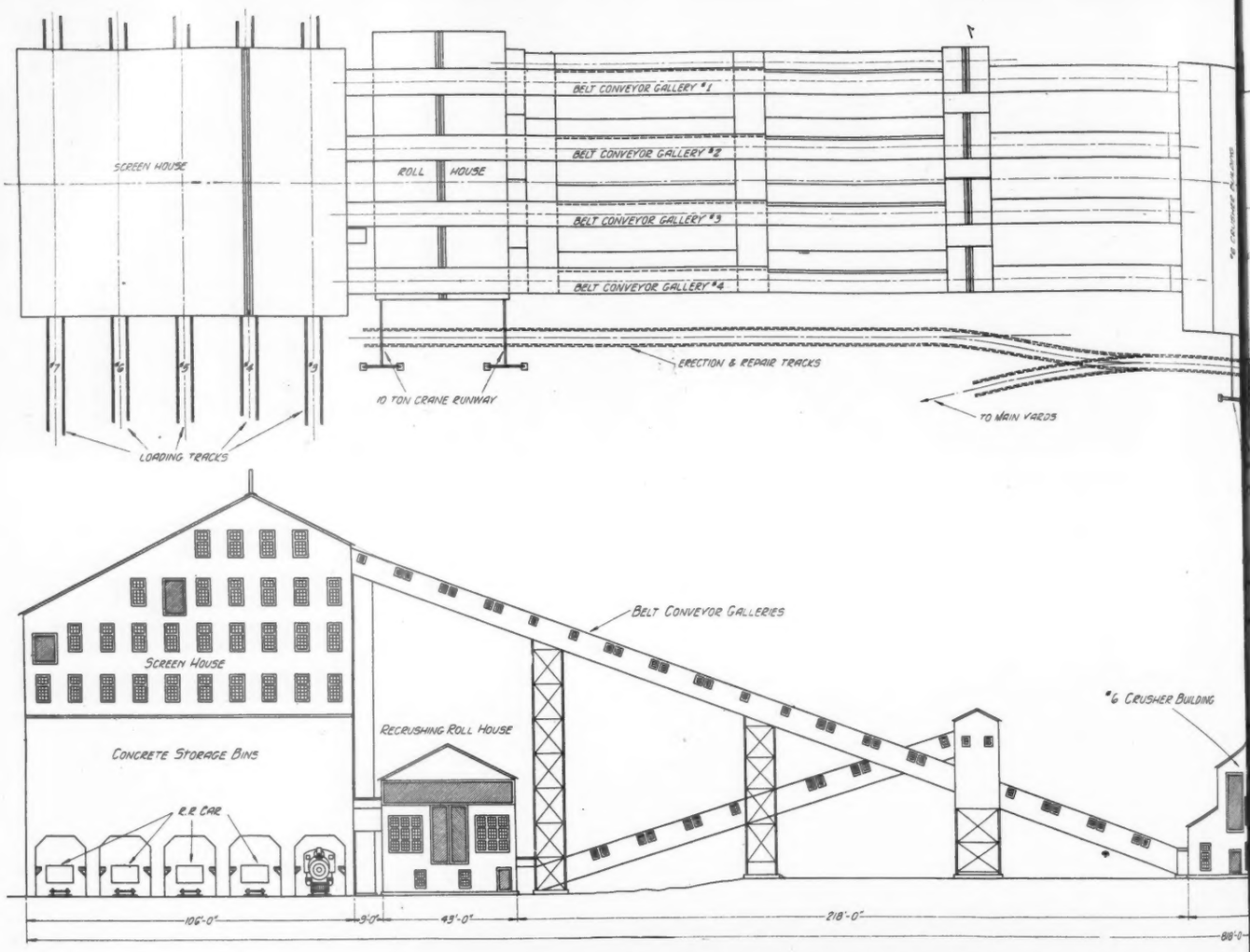
Mr. Talbot is a native of Massachusetts and came to Chicago in 1869 as a representative of the Dennison Manufacturing Co., the world's largest manufacturers of paper goods, afterwards becoming president of that concern and retiring from that office in 1909. At this time, the crushed stone industry in the Chicago district was in a badly disorganized state, due largely to the unsound business principles and practices in which the stone producers indulged. Recognizing this fact, the directors succeeded in 1910 in inducing Mr. Talbot to assume the presidency of the Dolese and Shepard Co., realizing that the sound business principles and high ethics which had made him a conspicuous figure in the business world, could not be without a beneficial effect on the industry. That they were right in their judgment is proven not only by the prosperity of the Dolese and Shepard Co. under his management, but also by the fact that, due largely to the influence he exercised though the medium of his company, the industry in this district has generally improved and is today on a sound and profitable basis.

In 1912, O. P. Chamberlain, a civil engineer who had been employed by the company in various capacities since 1904, was elected to succeed Mr. Phillips as vice-president and general manager, and the organization has continued unchanged since then. George L. Boyce is assistant secretary and purchasing agent, Bert S. Keller is sales manager, and T. M. Jones is general superintendent. The company's offices are located at 108 South LaSalle street, Chicago.

At stated before, the J. C. Buckbee Co. in 1908 and 1909 designed and superintended the construction of the present plant at Gary and since that time J. C. Buckbee has been retained by the company as their consulting engineer. During 1917 and 1918, while Mr. Chamberlain was serving in the army as a lieutenant-colonel in the construction department of the Quartermaster Corps, Mr. Buckbee was called upon to assume charge of the plant and operations at the quarry.

In 1904, interests identified with the Dolese and Shepard Co. organized the Chicago and Illinois Western Railroad Co., which built a line extending from Western avenue in Chicago to Willow Springs, Ill., a dis-

Views of different parts of the quarry operation giving some idea of the great extent of territory covered by this operation

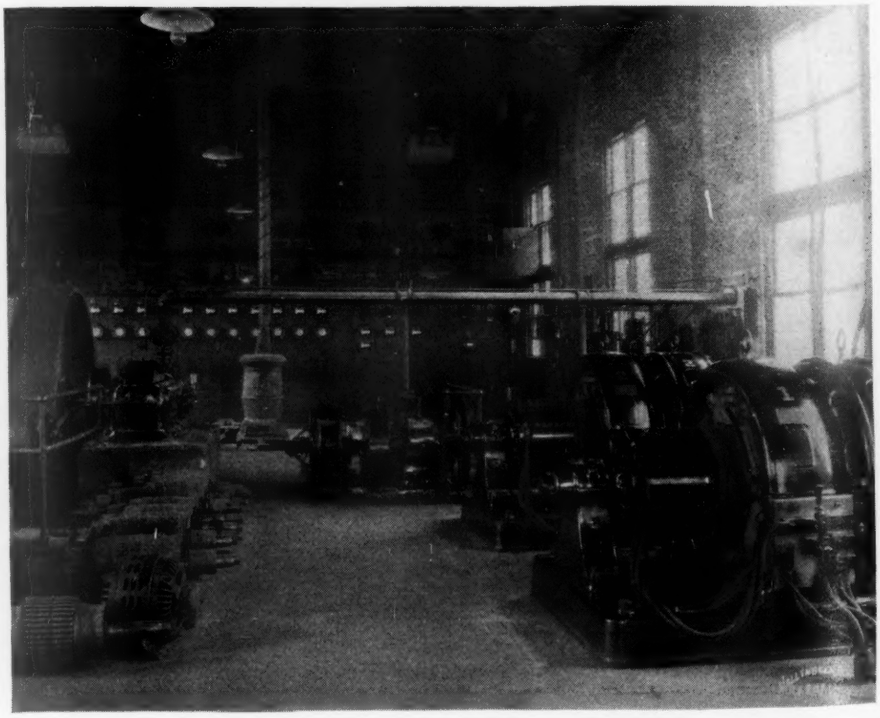


Plan and elevation of the Dolese & Shepard crushing plant, which w

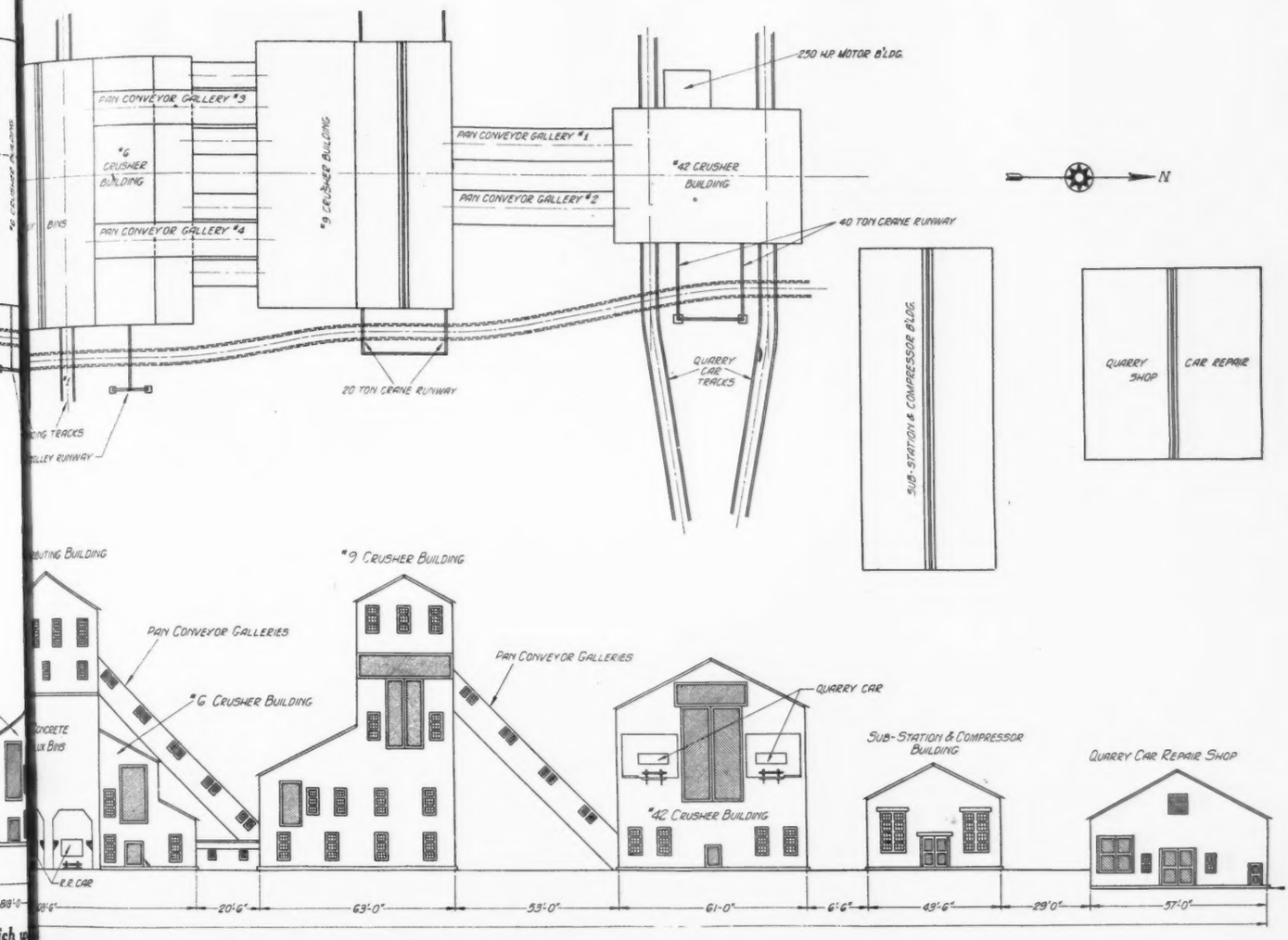
tance of about 12 miles. This road was built during the years 1904 to 1914 under the supervision of Col. Chamberlain, who was successively chief engineer, superintendent and president of the railroad company. The road was operated under the control of the Dolese and Shepard Co. until 1924, when it was sold to the Samuel Insull interests, eventually becoming the joint property of the Commonwealth Edison Co., the Peoples Gas, Light and Coke Co. and the Illinois Central railroad.

In common with most of the larger crushed stone producers of the country, the career of this company has not been uniformly profitable. However, since 1920, the company has enjoyed increasing prosperity and is now in a most excellent condition financially. The years have greatly enhanced the value of the land holdings, particularly the large acreage owned near Hawthorne, which is in the heart of a rapidly growing industrial district.

The Gary land holdings total nearly 450 acres and of this total about 100 acres are actively utilized as a quarry, although the entire area is underlain with stone to a depth of several hundred feet. The quarry is operated in two levels for the production



Power plant and switch-board of the Dolese & Shepard Co. crushing plant



t in 1908 and 1909 and has been in continuous operation ever since

of two different grades of stone. The upper level produces a high-grade flux stone much in demand by the steel mills and the lower level produces stone for various commercial purposes. The company is also a large shipper of agricultural limestone. The flux stone business is a large share of the total tonnage produced, being around 40% of the total.

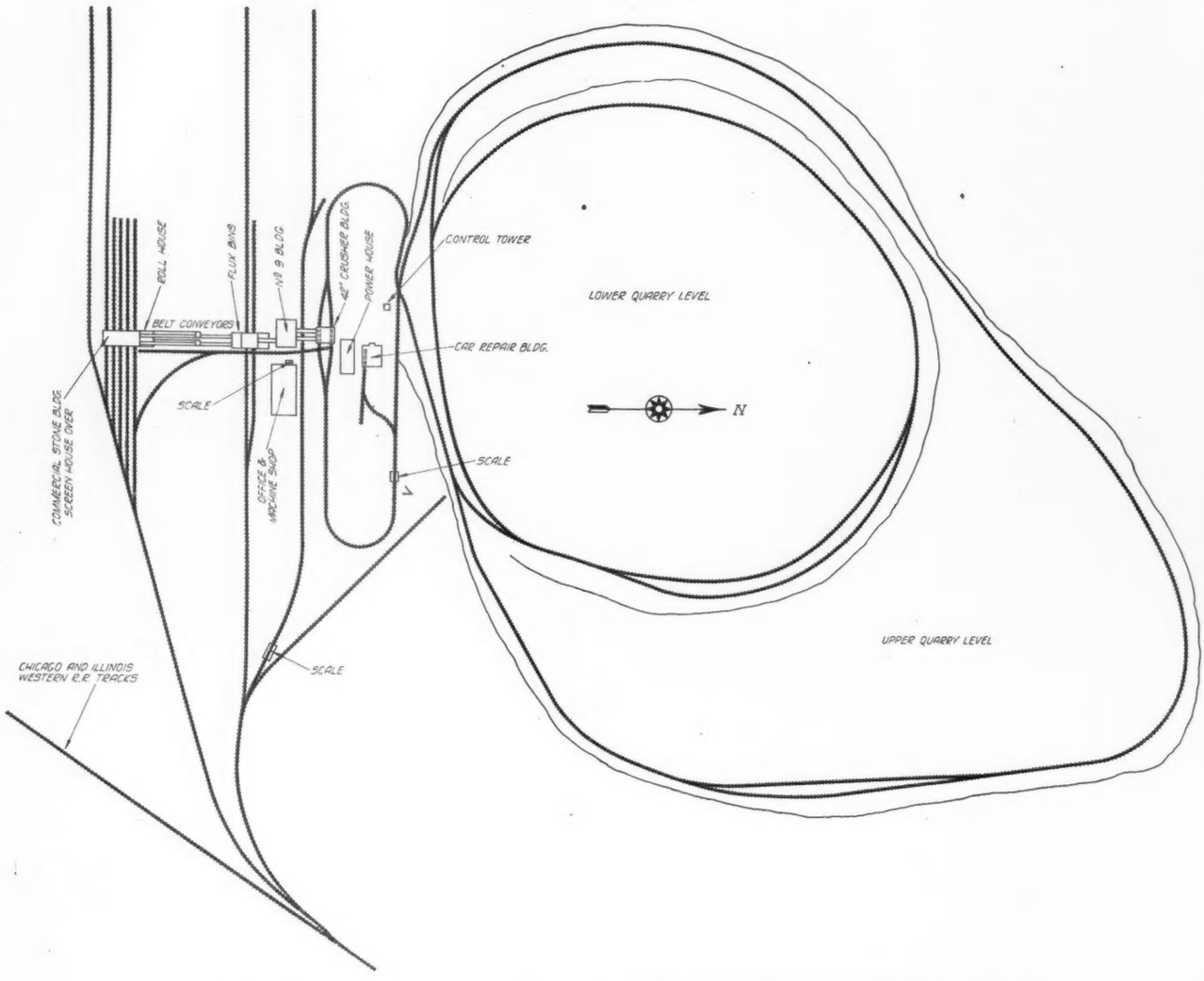
There are six steam shovels used in the quarry, three on the upper level loading flux stone and three on the lower level working on commercial stone. These shovels have 3½- or 4-yd. stone dippers and are all equipped with broad wheel mountings. There are three Bucyrus Model 95 C shovels purchased in 1909 and 1910, two Model 110 C machines, one bought in 1913 and one in 1922, and one Model 120 Osgood bought in 1924. A feature of the plant's operation is the high basis on which all of their equipment is maintained, which accounts for its long life.

Stripping is light and is done by an Atlantic Model 50 shovel and a Bucyrus 50-B, the latter on caterpillar trucks. Six electrically driven Sanderson-Cyclone well drill outfits are used in drilling and it is interesting to note that no new drills have been purchased since this plant has been in operation, again marking the high standard of maintenance to be found here.

There are no locomotives used in this quarry, all cars being handled by the "Woodford" system of electric haulage. In this method, a third rail is used carrying direct current to all tracks on which quarry cars are to be operated. Each car—and there are 21 of 12-yd. capacity each in this case—is equipped with electric motors and the controlling apparatus for the Woodford haulage system, so that its operations on the different sectors of the quarry track may be controlled by master controllers in the central control tower. In this manner any car may be started, stopped, or reversed at any point on the trackage system at the will of the operator in the control tower. Each car moves individually and carries a load of about 16 tons of stone out of the quarry and to the initial crusher over standard gage third rail tracks as shown on the map of the property reproduced herewith.

Electric motored quarry cars dumping into primary breaker

The company does its own switching of loaded cars and for this purpose maintains two locomotives, one of 30 tons (1916) and one of 60 tons (1923). Two 20-ton Industrial Works locomotive cranes (one 1908 and one 1912) are used about the yard for unloading coal and handling stone in and out of stock pile. Two railroad track scales and a truck scale are installed about the



Sketch plan (not to scale) showing the general scheme of quarry operation and track system

yards. An idea of the scope and magnitude of the quarry and yard operations may be gained from the fact that there is a total of nearly 20,000 lineal feet of standard gage track laid on the company's property, and of this total over 16,000 ft. are equipped with a third rail for the Woodford system.

The 12-yd. side-dump quarry cars are brought out of the pit by the Woodford system and to the building housing the 42-in. primary crusher. Here on a trestle, 30 ft. above grade, they pass out of the control of the haulage system operator in the central control tower and into that of an operator stationed inside the crusher house. This man spots the car at the dumping position and the car is dumped by an electric dumping device especially designed for the purpose, which engages one side of the car, lifting it, and dumping its contents into the hopper of the 42-in. "Mammoth McCully" crusher. This crusher is set to make a product 8 in. and under in size and is driven by ropes from a 250 h.p. motor. The building carries a 40-ton hand power traveling crane over the big crusher to facilitate the handling of repairs for same.

The primary crusher has a double discharge to two 54-in. wide, 24-in. pitch, heavy type pan conveyors, about 146-ft. centers and running upward at an angle of 45 deg. from the horizontal. These conveyors are of extra heavy construction, each conveyor weighing over 160,000 lb. and being driven through suitable reduction gearing from a 75-h.p. motor.

The pan conveyors discharge into bins feeding two No. 9 Gates gyratory crushers, belt driven by 100-h.p. motors and discharging directly into 48-in. by 20-ft. maganese steel fitted revolving screens having 4-in. round perforations. The oversize from these screens goes to a 48-in. wide, 24-in. pitch pan conveyor, 113-ft. centers, delivering into the flux stone bins. From these bins, the flux stone may be loaded into cars for shipments, or, when running on commercial stone, the contents of these bins may be fed to four No. 6 style "K" Gates secondary crushers. The fines from the screens following the No. 9 crushers, together with the product of the No. 6 crushers, are delivered to two 24-in. wide by 140 ft. long belt conveyors running underneath the flux bins and No. 6 crushers and delivering beyond the latter to the inclined belt conveyors leading to the top of the screen house.

These latter belts are 30 in. wide and 330 ft. long running at an angle of about 20 deg. from the horizontal. They discharge into four 48-in. diameter by 28-ft. long revolving stone screens fitted with 16-ft. long dust jackets and followed by four 48-in. diameter by 24-ft. long similar screens without jackets. The larger sizes of commercial stone are made in the above screens and for making the smaller sizes, there are provided four shaking screens, two 3x12-ft. Power and Mining screens and two 5x10-ft. Allis-Chalmers compensated type screens. All of the screening equipment is belt driven from suitable line shafting and motors.

The stone loading bins are ten in number, arranged in two rows of five each, the loading tracks running at right angles to the two rows of bins and underneath them. Each bin is 20 ft. in diameter and 32 ft. high, lined with paving brick.

Underneath each row of bins and at right angles to the loading tracks and over them is a 24-in. wide armored belt conveyor so arranged with suitable gates from the bins that any size stone may be drawn from the bins onto same. These conveyors discharge

Col. O. P. Chamberlain, vice-president and general manager

into two 54x24-in. Power and Mining crushing rolls, each driven through suitable line-shafting from 100-h.p. motors. The product of these rolls is carried by two 24-in. wide inclined belt conveyors 154-ft. centers, discharging about half way up onto the 30-in. inclined belts leading to the top of the screen house.

Five loading tracks are provided under the screen house bins for handling the commercial stone business and two under the flux bins. Compressed air operated bottom discharge bin gates are provided throughout for loading cars. Throughout the plant ample facilities are provided for the economical and quick handling of repairs to all the major items of equipment. Over each of the revolving screens and over the head shafts of the pan conveyors are provided suitable I-beams carrying trolleys and chain blocks. Over the No. 9 crushers, there are provided 20-ton hand power travelling cranes and over the crushing rolls a similar 10-ton crane.

The structures for all buildings are of concrete and steel. The commercial and flux stone loading bins are of reinforced concrete, lined with paving brick and have a total capacity of 5200 cu. yd., water measure, or about 6500 tons of finished product ready for shipment. About 750 tons of structural steel and 5000 yd. of concrete were required for the plant buildings, bins, foundations and conveyor galleries. The steel work was furnished by the Kenwood Bridge Co. and the concrete work was done by the MacDonald Engineering Co., both of Chicago.

Electric power is used throughout the plant and is furnished by the Public Service Co. of Northern Illinois. 33,000-volt high tension lines are brought to the stone company's power house, where there are located three 750-k.w. transformers reducing the voltage to 480 volts for distribution about

J. C. Buckee, consulting engineer

J. F. Talbot, president

the plant. In addition to the 23 panel metering and distribution switchboard, there are installed in the power house four motor-driven air compressors and two 200-k.w. motor generator sets producing direct current for the Woodford electric haulage system. The power house building is of brick construction and 42x104 ft. in plan.

Other buildings used by the company include scale houses; a control tower for the haulage system; a brick car repair shop, 57x60 ft.; and a wood frame building, 72x 162 ft., housing the plant offices, storerooms and machine shops.

The sixteen-year record of continuous and uninterrupted production is an enviable one and seldom to be found equalled. During this period approximately 12,000,000 tons of stone have been shipped from this plant. Assuming 40% to be flux stone and 5% agricultural limestone, the remaining 55% would have been sufficient coarse aggregate for 6,000,000 cu. yd. of concrete of average

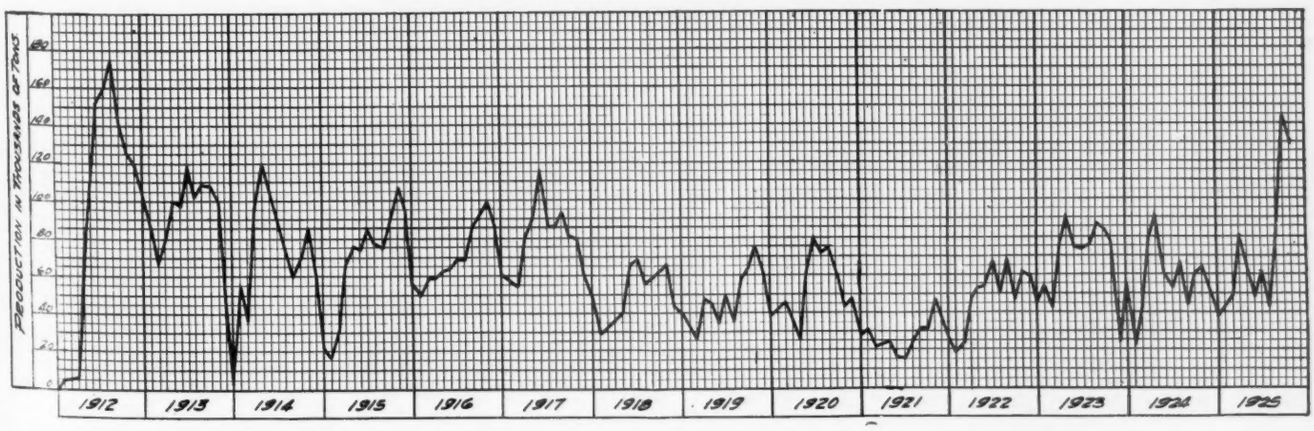


Chart showing 14 years' monthly production record of the Dolese & Shepard Co.

Bert S. Keller, sales manager

proportions, or enough for over 2500 miles of 18-ft. wide highway such as now being built in Illinois.

The details of the operations and shipments from the plant during 1919 were graphically portrayed in a supplement to the issue of ROCK PRODUCTS for July 2, 1921, and we now present a chart showing the scale of operations month by month over a period of fourteen years, from 1912 to 1925 inclusive. This chart shows monthly production from 1912 to 1918 inclusive and shipments from 1919 to 1925 inclusive.

The company maintains a considerable stock pile of finished product at the quarry and at the present time have on hand about 80,000 tons of concrete stone. The screenings pile once containing over 100,000 tons has been steadily reduced, due to the energetic efforts of the sales force in finding markets for same, until now this reserve pile has been reduced to practically nothing and they are shipping all screenings as they are being produced.

Thomas Jones, superintendent

Hydration of Lime*

DIFFERENT experimentors have shown that the conditions under which lime is hydrated are important in the properties of the hydrate formed. Hydrated lime made by adding water to lime is coarser and settles more rapidly than if it were prepared by adding lime to water. Further, it has been shown that lime hydrated with excess water was finer and settled more slowly than if the theoretical amount was used. The conclusions based on these experiments were that the lower the temperature of hydration, the finer the product; fresh slaked lime is finer than commercial hydrate, and slaked lime will settle more slowly if allowed to stand in contact with water for some time.

In the experiments the quality of the hydrated product was evaluated by testing its rate of reaction with acid and its rate of settling in water and by microscopic examination. In general, the relative rating of quality by any one of these methods checks closely with the ratings by the other two.

The best product was found to be one prepared by hydrating quick-lime with a large excess of water in boiling solution. Hydration with the theoretical amount of water or with water vapor gave a coarse inferior hydrate.

Effect of Impurities and Process of Manufacture on the Properties of Calcined Gypsum

IN REVIEWING the literature on the process of manufacture of calcined gypsum it is found that while the various steps used in its manufacture have been studied in detail from a mechanical standpoint, little effort has been made to correlate the variations in the product with the different methods used and the impurities which sometimes naturally occur. With this in mind a study has been made at the bureau of the effect of the fineness of the gypsum, the temperature of calcination, and the effect of some materials in the raw gypsum on the properties of the calcined product. Three different sizes of materials were calcined to four different temperatures, while one size was calcined with seven different impurities, and the properties of the products studied. The properties investigated were composition, tensile strength, fineness, time of set, and plasticity. As only two of the impurities that were used gave deleterious results in the amounts employed, the percentage of each was decreased until the resulting product was approximately the same as the one in which no impurity was present.

In view of the results obtained, the following conclusions seem to be justified:

1. Raw gypsum passing a No. 100 and retained on a No. 200 sieve calcines more readily than does coarser or finer gypsum.

2. In general, the tensile strength of 1:3 gypsum-sand mixes is increased with increase of the time and temperature of calcination of the gypsum and fineness of the calcined gypsum.

3. The plasticity of 1:3 gypsum-sanded mixes is increased by increased fineness of the gypsum, and by increased semihydrate content, and is decreased by the presence of artificial anhydrite.

4. The time of set of calcined gypsum is lengthened by an increase in the degree of calcination.

5. Of the various impurities studied only sodium chloride and sodium sulphate are deleterious when present in the raw gypsum, although silica does lower the tensile strength.

6. The sodium chloride content of gypsum should be less than 0.15% in order to escape deleterious effects on the properties studied.

7. The sodium sulphate content of gypsum should be less than 0.5% in order to escape deleterious effects on the properties studied.

8. The impurities studied all lower the plasticity of 1:3 gypsum-sand mixes.

9. Sodium chloride when present in raw gypsum seems to convert the gypsum during calcination, into an anhydrous sulphate, which does not appear to revert to the dihydrate on the addition of water.—*Technical New Bulletin* of the U. S. Bureau of Standards.

*Abstract from Ind. and Eng. Chem., 18 (1925) 118.

Preparation of German Fuller's Earth

THE bleaching power of the German fuller's earth, as it comes out of the mine, is much smaller than that of the American earth. If the German earth, however, is treated with hydrochloric acid, its bleaching power increases and surpasses that of the American fuller's earth; hence the so-called German "high-active" fuller's earth.

The raw earth, as it comes from the mine to the factory, is washed with water to free it from mud. All dirt, stones, and organic admixtures are removed by screening. The earth, after having been washed until there is only a thin pulp left, is mixed with hydrochloric acid in an acid-proof tank and heated to the boiling point for several hours by introduction of steam. The stirring machine prevents the fuller's earth from settling, so that it is always in contact with the hot hydrochloric acid. This operation completed, the mixture is placed in a storage reservoir, where the greater part of the acid is removed. From the reservoirs, the earth is pumped into filters, where it is freed from the remaining acid and liquid. By washing with water in the filter, any residual acid is removed. The fuller's earth, as removed from the filters, contains about 60% of water. To eliminate this, the earth is put into a kiln, where the moisture is reduced to about 10%. It is not necessary to remove all water. The earth comes out of the kiln in pieces from 1 to 2 in. in diameter. —*Engineering and Mining Journal Press.*

Limestone Abundant in All Parts of Florida

The Most Important of Non-Metallic Minerals Is Already the Basis of a Great Industry Which Promises to Develop Rapidly

By Edmund Shaw
Editor, Rock Products

AFTER one has been in Florida a short time he has heard a lot about the advantages of the state, its wonderful winter climate, its ability to grow anything from sugar cane to salad and all of the real estate man's boom stuff. But there is one good feature of the state that is never mentioned and yet it is perhaps more important than all the rest and that is, that Florida has an abundance of lime.

Lime, either as limestone or the burned product, is the most indispensable of minerals in our modern industrial life. For that matter, the recent investigations of Dr. McCallum and others have shown it to be the most important in our social life. Everything we touch, taste, see, handle, stand under or walk upon runs back to lime somewhere. If it is not an integral part of the product it is used in the process of making it, or in the making of the tools and appliances by which it is made. Because it is common and easy to obtain we do not appreciate its importance. But the state that has large and workable limestone deposits has a resource of incalculable value, as everyone familiar with modern industry must realize.

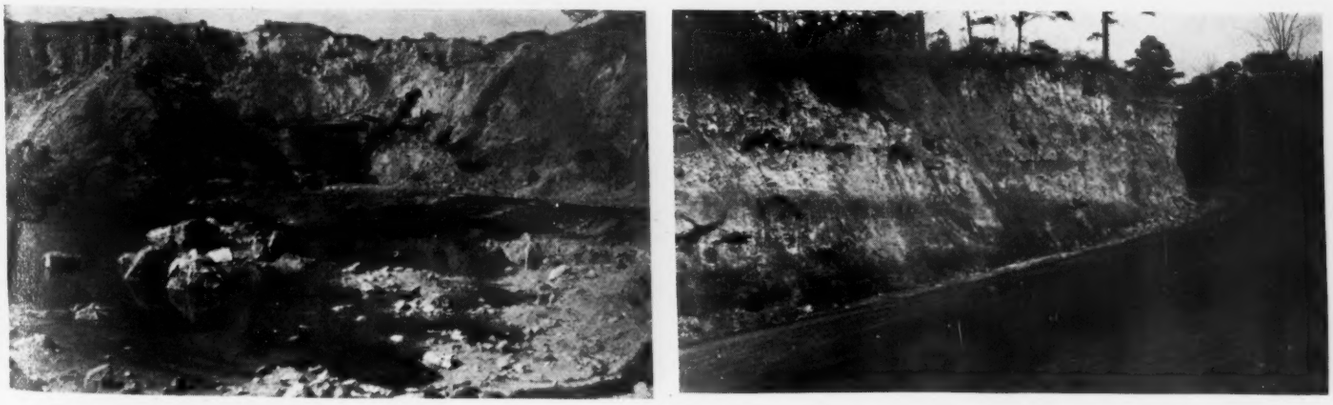
Of course Florida has other important mineral resources. It has the largest known deposits of phosphate rock and an abundance of kaolin, fullers earth, diatomaceous earth, silica sand and other important non-metallics. Gypsum has just been discovered (as gypsite) in what it is hoped will be a commercial deposit. Of the metallic minerals, bog iron ore has been found in deposits that are worth investigating and the minerals which contain the rare elements zircon,

Stuart Mossom, assistant state geologist of Florida

tantulum and thorium are being produced on a small, although commercial, scale.

The development of some of these is for the future, but the limestone deposits are already the basis of a great industry. Yet it is only in the development stage. Owing to the softness of the rock, lime is burned in a type of kiln which was built 36 years ago, with high priced wood for fuel, and the result is that Tennessee, Georgia and Alabama limes can pay the freight into Florida and be sold in competition. But experiments with other kilns and other fuels are being made so that it may be confidently predicted that Florida will soon produce all the lime it uses and, owing to the excellence and purity of the product, it may even build up an export business. Cement is not made at present, but at least two plants are proposed and the ground prepared for building them. Road material for the new and excellent type of road that has been developed here is produced in large tonnages, but the production of concrete aggregate on a really large scale is quite recent. The difficulty of obtaining cars and the pressure of unfilled orders have caused all thoughts of expanding the business or improving the methods to be laid aside. When these return to something like normalcy a period of development will begin.

The reader who wishes to know more of the Florida limestone deposits is referred to the excellent report by Stuart Mossom, the assistant state geologist of Florida, published a short time ago. Many of the Florida plants have been already described in the articles by J. R. Thoenen which have appeared in recent issues of ROCK PRODUCTS. This letter will only record the observations gained from a hasty visit to some of the important producing areas and some conclusions which may be drawn from them.



Left—One of the quarries of the Ocala Lime Rock Co. Right—A cut through the Chattahoochie limestone which was once used for making natural cement

Left—Quarry of Commercial Lime Co., one of the highe·t faces in the district. Right—Face of Oakhurst quarry, Florida Lime Co. It is 1500 ft. long and 60 ft. high.

A few days spent with Mr. Mossom gave a much appreciated opportunity to acquire an unusual amount of information on Florida limestones, for he is one of the few men who have studied coastal plain geology in an intimate way.

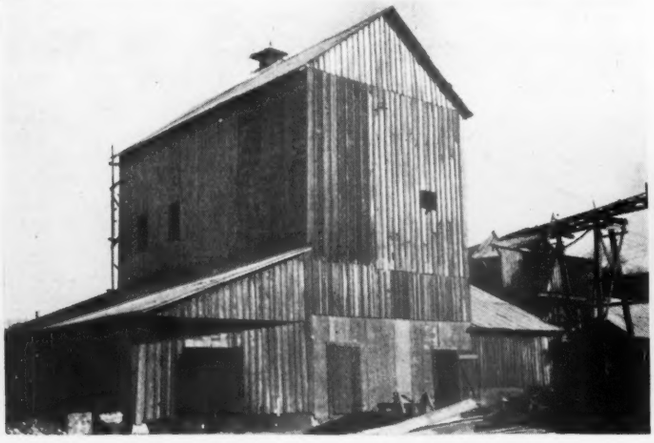
Instead of saying that Florida *has* lime, it would be almost correct to say that Florida *is* lime. Long before the state existed limestone beds were formed in the sea. Some of these were laid down as beds of shells, some by corals, but much of these beds are made of lime precipitated from warm sea water, by the bacteria which act on the gypsum in solution, to produce calcium carbonate. The process is still going on around Key West and the lower part of the state and is being studied there by geologists today.

The deposits are very young as compared with the limestones which are of so much importance in Pennsylvania, Ohio and other northern states, as they are all of Eocene or younger formation. They were laid down in shallow water on a sinking ocean floor, which accounts for their thickness, and afterwards raised when the land which is now Florida was raised, presumably by lateral pressure. In part the limestone was covered by the sand and clay which resulted from the breaking up of older crystalline rocks to the north and which was brought down by streams. But the limestone is exposed in many parts of the state.

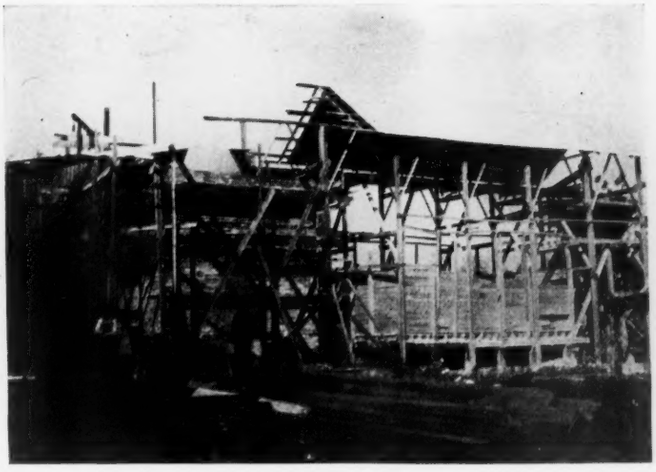
Beginning at the southern end of the state the map shows, first of all, the Miami oolite, of very recent origin. This is important commercially and is called Ojus stone because it is worked on a large scale by the Ojus Rock Co. near the town of Ojus. The whole south half of the peninsula above this is of marl. Much of this hardens on exposure and makes excellent road material. Both the hardened marl and the Miami limestone are used for aggregate, especially in making concrete products. Still north, around Tampa, is the Tampa limestone, the hardest in the state. It has a French coefficient of 6.3 to 7 and can be used for ballast, aggregate and road metal. Brooksville is the center of a large production by the plants of the Florida Rock Products Co. and the Concrete Rock Co. The cement plant to be erected near Tampa will use this rock as raw material. Still farther north is the great area of the Ocala limestone covering parts of eight counties. At present this is the most important commercially, as it is burned for lime and crushed in large tonnages for road material. And farthest north of all up by the Alabama and Georgia borders are the Marianna and Glendon limes, not yet of much commercial importance. A very impure limestone, the Chattahoochie, found up by the border, was once the basis of a natural cement industry. Coquina—shell rock—has been much used as a building stone and for making roads. At present it is a favorite facing for concrete building blocks.

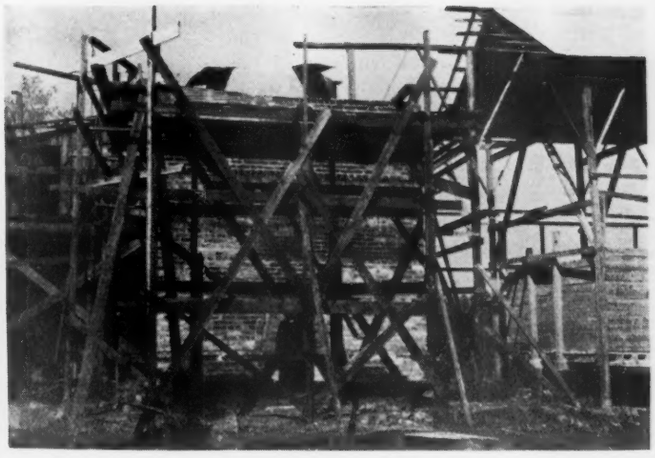
The Ocala limestone is producing a heavy tonnage, especially in road material. A list of the principal plants shows 27 of them operated by 15 companies. The combined production would be 31,700 tons per 10-hour day if they could be run continuously, and it may be stated quite positively that they would be run continuously for a considerable time if the railroads could furnish cars. The demand for the material is strong.

As those who have read Mr. Thoenen's articles know, the rock is a very soft and very pure limestone. An average of analyses from the Oakhurst quarry showed 99.3% $CaCO_3$, which is said to be the usual figure for a great part of the field. It burns to a beautiful white lime which has excellent plastic qualities. The methods of quarrying and crushing have been so recently published that it would be mere repetition to describe them. Probably the reader remembers the peculiar churn drills with cylindrical bits and the simple crushing plants



Left—New hydrating plant, Florida Lime Co. Right—Plant of Commercial Lime Co.





Left—New kiln and aggregate plant, Florida Lime Co. Right—Building a new kiln at one of the Florida Lime Co.'s quarries. It is of the same type as the first kiln built 36 years ago

in which single-roll crushers are so much used. But there are some facts about the rock itself that may not be so familiar.

As a road material, it is perhaps unique. It is so soft that it can often be broken with the fingers—not much harder than chalk. But it has a wonderful binding or self-cementing quality. If a 14-in. layer of it is put down and rolled and compacted until it is only 8 in. thick, it forms an admirable roadbed, suitable for heavy traffic—until the water strikes it. So to protect it a seal coat of asphalt and crushed slag, from Birmingham, is rolled on top and this keeps the water away. Later it is usual to add a 2-in. coating of sheet asphalt.

I was driven over roads of different ages and all were in excellent condition. Some of the earlier roads put down with 4-in. and 6-in. bases have gone to pieces, but one which is eight years old with an 8-in. base has stood the heavy traffic very well. Whether such a road can rival a concrete road for really heavy traffic or not is still a question. The makers of this road material say that it will and that experience has already proven it. Anyway, it is an excellent example of that modern engineering which takes the materials at hand and gets a satisfactory result from them.

The cost of this type of road for one average stretch of 11 miles was given at $26,000 per mile. Most of the cost was in grading, for each mile took 1460 yd. of road material, which is furnished at $1.10 per yard, plant price.

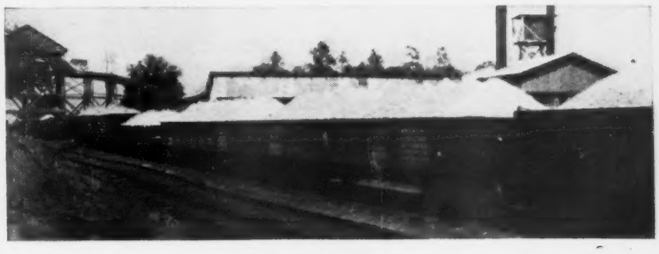
The rock has some extraordinary qualities

C. G. Fraser, operator of first lime kiln for Ocala limestone in Florida

when used as a concrete aggregate. From its softness one would say that it would have no value as an aggregate, but it is the basis of an artificial stone industry which is of great and growing importance. The finely divided stone, in common with the dust from many other limestones and crushed slag, has a puzzuolanic effect, giving the product a much greater strength than would be indicated by the amount of cement used. When the limestone is ground to about ⅛-in. and finer and used in a fairly rich mix, the resulting concrete resembles a fine grained limestone. Being fairly soft and without grain, it is easy to cut, shape and plane with machine tools.

Two concerns in Jacksonville are making and cutting this artificial stone in large quantities, the Jacksonville Concrete Co. and the Arnold Stone, Brick and Tile Co. The work is by no means confined to trim stone and ornamental work. Whole buildings are made of this artificial stone. One of them is a church in Ocala. The limestone came from a quarry not far from Ocala and was crushed and sent to Jacksonville, where it was made into concrete blocks and slabs that were cut, either by hand or machinery, to ashlars, mouldings and the like. These were sent back to Ocala to be erected. No

Draw port on new kiln. The recess is to allow the heat to rise so men can draw the kiln more comfortably



Left—One of the plants of the Ocala Lime Rock Co. Right—Loaded cars of road material at Dixie Lime Products Co. plant

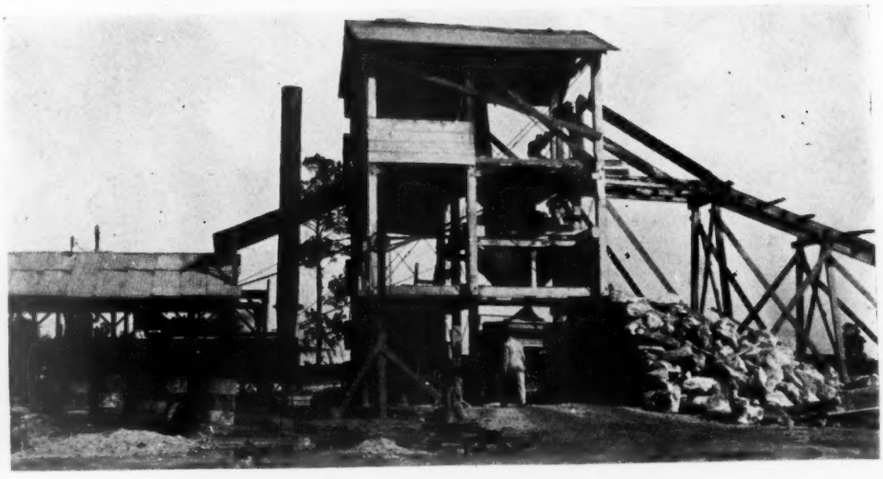
one would know but what the church was built of a fine grained limestone of a light cream color. A chemical analysis of the stone would leave one with the same opinion. Only the microscope of the mineralogist would detect that the stone was an artificial and not a natural product.

The permanency of this artificial stone has been established by years of exposure to the weather, so it is freely used by architects for the better classes of buildings. The cost, at Ocala, was said to be 25% less than the cost of cut natural limestone would have been.

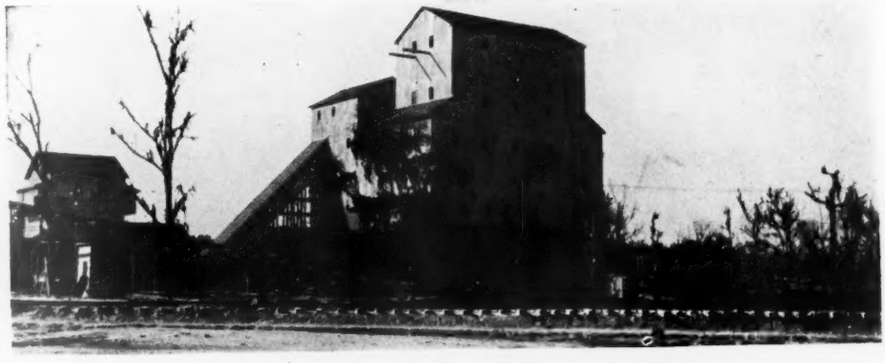
The Lehigh Portland Cement Co. is reported to be preparing to erect a cement mill near Ocala, having bought the ground that had been acquired by a local company for the purpose. It is surprising to learn that in years past both geologists and chemists had condemned the Ocala limestone for cement making. The geologists objected to it because they found no large and continuous bodies which might be worked according to modern ideas of quarrying, and this might have been excusable before the geology of the deposits was thoroughly known and before the present large scale workings were opened. There are now excellent continuous quarry faces, as the photographs show. But some of the chemists must have used the "graphite" method of analysis, or at least one of them did, who reported that the rock contained 8% of magnesia. No one else has ever succeeded in finding more than a trace of magnesia. The cements made from this rock in doing the work preliminary to building a plant were exceptionally good, and in the mortar tests they showed a higher tensile strength in three days than most cements show in seven days.

The burning of the Ocala rock to lime has been well described in Mr. Thoenen's article in Rock Products for January 23. The small wood fired kilns (they are of only 6 ft. internal diameter) have been adhered to because other types were failures. The stone "sticks" and will not "follow" as the draw is made. Attempts to use oil as fuel in the present type of kilns resulted in the rock sticking so hard that it could hardly be barred down. Then a rotary kiln was tried and several different kinds of trouble developed due to the breaking up of the soft rock and the tendency to pack. Experiments are now going on with rotary kiln burning that may solve the problem, one method that promises well being to dry and preheat the limestone before the actual burning takes place.

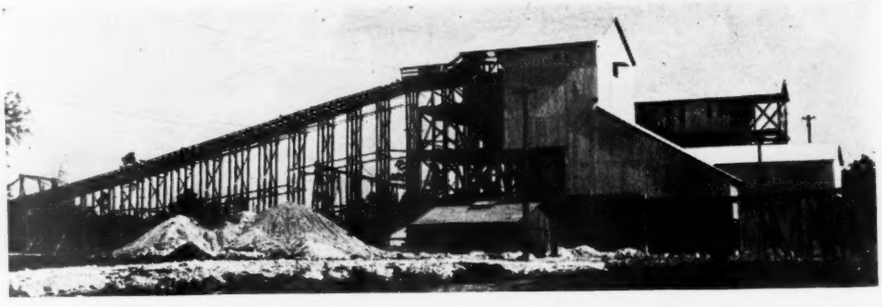
J. M. Meffert and C. G. Fraser, both now of the Florida Lime Co., were the pioneers of the lime industry. The first kiln was built for Mr. Fraser and his associates by an unknown genius named Hough in 1890, the type still used today. Both men have now grown wealthy with the advance of the state, but both are as much interested in the lime industry as ever, although they are of an age when many men retire.



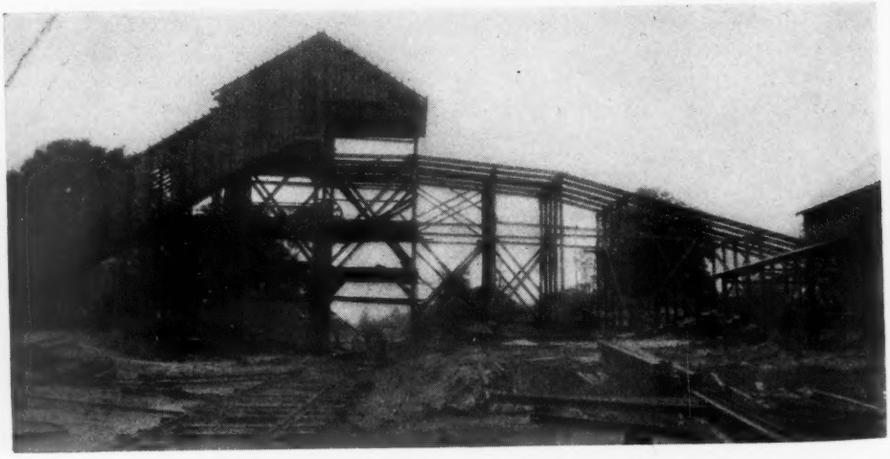
A semi-portable crushing plant for road material



Florida Rock Products Co. plant near Brooksville



Concrete Rock Co.'s crushing plant at Brooksville, Fla.



Dixie Limestone Products Co.'s new roadstone plant

Mr. Meffert was engaged in rebuilding a hydrating plant when I met him and Mr. Fraser was directing the building of a new kiln and the remodeling of a crushing plant. Both read Rock Products and other technical magazines intensively and were eager to talk of recent progress and developments in the lime business. It is inspiring to meet such men.

The plants crushing the Ocala limestone appear small, even though they produce large tonnages, because they are so simple. The plants crushing the Tampa limestone are very large and well equipped and will compare favorably with the best stone crushing plants in the northern states. The plant of the Florida Rock Products Co., which was designed by the Allis-Chalmers Manufacturing Co.'s engineering force, is an unusually fine plant. The flow sheet is complicated somewhat by the fact that all the stone must be washed, as the limestone occurs in masses with a matrix of white clay. But the washing methods adopted in both this plant and the Camp's plant (the Concrete Rock Co.) are efficient, as the finished stone is very clean.

The Camp's plant is interesting because it has borrowed some of its best features from the practice of washing phosphate rock in which the owners were engaged for a long time. Naturally they were familiar with all that had to be done to produce a clean product, for phosphate rock has to be exceptionally clean, as compared with stone or gravel, to be marketed. The series crushing adopted in this plant is exceptionally good, both the machines and the reduction ratios being figured to lose the least amount in too fine a product.

These two plants have done much to help the aggregate situation in Florida, where the demand for "anything that will make concrete" has caused some very dubious materials to be used. Some of these will be described in a succeeding letter to be published in another issue of Rock Products.

Annual Convention of the Sand-Lime Brick Association

Instructive and Enjoyable Meeting at New Orleans, Mardi Gras Week

J. MORLEY ZANDER (Saginaw, Mich.), president of the Sand Lime Brick Association, in his presidential address at the New Orleans, La., convention, February 9, said, in part:

This is the twenty-second time we have met together in convention since this association was organized in 1903 by a few producers of sand lime brick. There were not so many of them at that time. The brick they were making were new to the American market and there was much to learn, both in the use and making. Some of the founders of this association are gone, some called by death and some to other lines of endeavor, but many of them are veterans in the business today and are here with us to give of their mature counsel and accumulated experience that the other fellow newer in the business may have an easier road to travel to success; and the making of sand lime brick has become a successful business with a product that has won the favor of the builders by its excellence.

It has been the practice of this association to meet in cities where some member is carrying on the business of making sand lime brick, so the pleasure of enjoying the hospitality and famed beauty of New Orleans was made possible by Otto Schwartz of the American Brick Co., whose factory is located here.

This business of making sand lime brick would not be the large business it is today if there had been no Sand Lime Brick Association. It was a new business groping its way in the darkness of inexperience 25 years ago. No one knew the true value of the new and untried product. Many entered the business with the most extravagant ideas as to use and profits. But happily in the early days of the industry in the United States and Canada the association was formed by men of integrity, forward-looking and energetic, who were determined that the manufacture of so good a product should be placed on the most advantageous plane; that uniform quality and the lowest possible production costs would prevail everywhere. Through co-operation of the members of this association from the beginning the major portion of this board plan has been realized, and as it is a live plan it grows daily in its scope and there is a greater need of pulling together today, through our association, than ever before. There is much to do and each can do something.

J. Morley Zander, President, Sand Lime Brick Association, 1925-26

Each of you can get in touch with your nearest neighbor in this business and exchange visits and ideas with him. You cannot lose by giving to him ideas you have already used, and you will gain by his ideas.

Helped by the U. S. Bureau of Standards

In the past years your association has been ably assisted by the Department of Commerce, particularly through the Bureau of Standards. Many tests of the finished product have been made and likewise the materials from which you are making brick have been studied from many angles. This work is still going on. Some of it must be financed by the association and it is of tremendous value to the members. Architects, engineers and the city building departments demand and insist on having reports by recognized agencies on the characteristics and qualities of your product, and no agency is more widely recognized and none better equipped than the Bureau of Standards of the Department of Commerce at Washington.

One of the most recent tests made by the Bureau of Standards and your association is reported under date of January 25, 1925, and has proven of tremendous value to those of us who have made use of it. It is called "Compressive Strength of Sand-Lime Brick Walls," and as its title implies, entire walls were placed in the testing machine to determine what they would carry and how they would act under various loads and constructions. There are still more tests to be made at the Bureau of Standards, and if you are asked to contribute remember that the gain to you and to all, far outweighs the cost.

These various tests will be used in working out the answer to another live question of the day, that is building code requirements, both local and national. Little can be done to help members to give information to building code committees in different localities unless the association can secure the information from a reliable source, like the Bureau of Standards. Your association is, therefore, compelled to go ahead continuously with tests at Washington to protect your interests.

Fighting Freight-Rate Discrimination

During the past few years your association

has taken on another activity that is of vital interest to most of your members. It is the matter of freight-rate discrimination. To carry on this work has taken a lot of time of your traffic committee and officers and has entailed some expense to your association, but in the main both the work and expense have been borne by members of the traffic committee and by members or groups of members who are the most interested in the locality. In all this work your association has taken an active part, and I am pleased to report that in many instances correction of discriminatory rates has been achieved. This work is still in an active condition and is going to require considerable time from your officers and traffic committee in the future. To carry on the increasing activities of your association calls for more work on the part of your officers and requires more money than has been available in the past. As stated earlier considerable of the work of the association has been financed by voluntary contributions of the more interested members, but in spite of this the association is continually in need of money, so that the honor of being an officer of this association carries with it not only an obligation to work for the good of all the members, but likewise the necessity of paying out money as well.

This association is the second in point of age in trade associations on the continent, and it has been very much alive and productive of an enormous amount of good to its members and is still producing.

A History of the Sand-Lime Brick Industry of Michigan

JOHN L. JACKSON (Saginaw, Mich.), fondly called the daddy of the sand-lime brick industry in America, presented a very interesting paper on the history of the industry in Michigan, from which we quote:

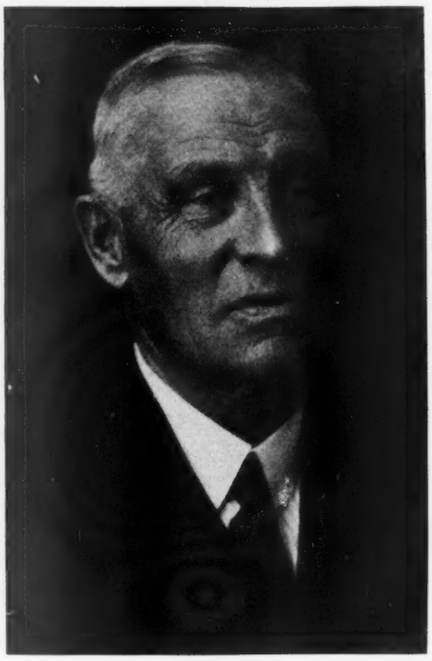
We are told that sand-lime block and brick have been in use as long as lime has been used in laying up building materials in walls. They were used in laying up the walls of Solomon's Temple and other buildings of that era. Some of this material is being exhibited in the British Museum at London.

Sand-lime brick came into general use in Europe about 1880 when Dr. Michaelis developed and patented his process for hardening brick by steaming, instead of letting them harden by exposure to the elements, which took from three to eight months on such brick as were being made and used previous to the use of steam in hardening.

My attention was first called to the industry by a German chemist, in the employ of the Saginaw Sugar Co., in the spring of 1899, as we had to replace a large number of the brick in the walls of this company's factory and also that of the Saginaw Plate Glass Co. caused by hard rains in the fall and early winter of 1898 followed by cold winter weather. Being vice-president and director of the two companies, I was very much interested in a product that would stand our climate better than what we were using at the time.

After looking over such printed matter as the chemist had, I took up with E. C. Ewen, a business associate and president of the U. S. Graphite Co., and two of his associates (Wickes brothers) through their European representatives and our United States consuls the getting of such additional information as we would require to determine, without too much expense sand-lime brick adaptability to our country. Early in 1901 Mr. Ewen and I visited such parts of Europe where the brick had been in use the longest and were being made at the time. We planned our visit to be in Berlin, Germany, at the time a convention was being held discussing different building materials then in use there. This meeting was very well attended by representatives from different parts of Europe, Asia, and a few from America. We received valuable information there, and had an opportunity of meeting many of the leading manufacturers of the brick and of equipment for manufacturing sand-lime brick.

There were a number of processes in use, all of which were claimed to be the best, and were being exploited by the manufacturers of the machinery. There were several plants using the silo system in Austria and Germany. Others using the Schwartz, a combination of the silo and their patented proc-



John L. Jackson, President, Sand Lime Brick Association, 1926-27

ess, the Komnick, mixing the hydrated lime with bank sand and others that had patents on chemicals for use in hardening the brick, different types of mixers, ball or pebble mills, hydrators, upright and rotary table presses, etc., all of which were very interesting and confusing to the layman.

After having our material tested, put into brick form, we decided the Komnick system and machinery was the better for us to use because the brick made in factories they had installed were giving better results, and were best for our conditions and most reliable. The lime was hydrated in boxes or quenchers under the freshly pressed brick in the hardening cylinders as they were being hardened, then put through a grinder or pulverizer when the lime was mixed with the bank sand (without drying) with a double shaft differential mixer and pressed into brick form on a rotary table press. Then run into the hardening cylinders on metal cars, steamed for 8 to 10 hours under 120 lb. steam pressure. I will call this for further reference System No. 1, as it was the first in use in the United States.

On our return to Saginaw we organized a company to make the product, shipped from Germany such equipment as had to be made there, having the rest built at home, and all installed and started under the supervision of an engineer sent from Europe. We made the first brick in the late fall of 1901, bricking up the walls of the factory, before the severe winter weather set in.

We did not find it as easy to dispose of the product as we had been led to believe it would be, and at no time were customers falling over one another or waiting in line for the new discovered product. We also found that the product met with disfavor from the manufacturers of clay brick, and they did all they could to prevent our getting a start.

Machinery Re-designed

Within a year after starting we found the press (which pressed the brick from both sides) was not adapted for our purpose, being too weak or lightly constructed, and was too expensive to keep operating. I had to go to Europe again in January, 1903, to find a press better adapted to our local conditions. After looking over the different makes of presses on the market there, I decided that the 12-mold press made by F. Komnick, Elbing, Germany, was the best one for our use. This press was installed during 1903, and has been in constant use since (although we had to make changes to strengthen and replace the weak parts and make such parts as had to be replaced interchangeable in order to speed the presses up to get a better output and product). This press is still operating and making better than 3000 brick per hour.

In 1908 I again visited Europe to see what if any changes or improvements were being made there.

In 1912 the Saginaw company changed the double shaft mixer to wet pans and installed a second 12-mold press, and later changed the old type of hydration to a continuous operating type of my make. This plant has a yearly capacity of from 15 to 18 million common building brick, mostly white.

An Interesting Record

During 1902 an Austrian promoter (Huenneke) came to the States with a system, claiming to have a patent on a chemical he used for making a better brick than had ever been made before. In a few years he is said to have made enough money to return to Europe and retire by selling state and county rights. His system was what was known as the silo system. The unslaked lime ground fine was mixed with dry sand and left in silos, after adding water, to complete the hydration of the lime. Then the mixture was put through a ball or pebble mill and pressed into brick form on a 4-mold upright press, then steamed by putting the chemical he furnished into the cylinder with the freshly made brick. This I will call System No. 2, and it did not prove successful because the lime that was then sold was unreliable, and some of it slow in hydrating, taking several days to complete its hydration, and causing a lot of poor brick to be made. The result was the closing of the two plants in Michigan. One of these was started in 1903 at Detroit, and after operating for a few years was closed down in 1908 and a new company was organized, changing over to System No. 1, using the wet pan for mixing and one 12-mold rotary table press. In 1924, they changed their system of hydration to a continuous operating hydrator adding a bar mill and another 12-mold press. This company has been very successful and has a capacity of 15 to 20 million brick per year.

The other System No. 2 plant was started near Saginaw during 1903 and made some very good brick, but had to discontinue on account of the uncertainty of its product, after operating several years. It was also closed down, the equipment was sold and shipped to Grand Rapids about 1912, where a company was organized and a factory installed to make brick by the same process and equipment. On account of the equipment

and poor management they were not able to compete with the local brick plant, after trying to operate for several years this plant was discontinued and their equipment sold as scrap.

In 1903 a company was organized at Sebewaing using System No. 1, pressing brick on a 8-mold rotary table press, which was replaced in 1905 by a 12-mold press, same make, to increase their capacity and reduce the cost of the product. This plant is still operating and has been since it started over 20 years ago.

In the same year, 1903, a company was incorporated at Sault Ste. Marie and installed a plant using the System No. 1 and an 8-mold rotary table press. This plant operated until about 1908 when the managing owner lost his property by speculating in copper, and had to sell his holdings in the brick plant. The equipment was sold and resold until I lost track of it.

In 1904 a company was organized at Sibley and installed a plant using river sand and the System No. 1 with a 12-mold rotary table press. In 1910 they increased the capacity of their plant by adding additional equipment and another 12-mold press. This plant was operated until about 1917 when they sold their interest in the lime quarry, dismantling the brick plant and disposing of the equipment. Most of it was used during the war in other industries.

Another company was organized in 1904 at Manistee. This company built a plant using the System No. 2, pressing the brick on an English 10-mold press. On account of the uncertainty of their product, trouble with their press, which was too light for the work and the time it took to get repairs from Europe, this plant was closed, equipment sold and shipped to Milwaukee in 1909.

Another company was organized in 1904 at Flint, installing a plant using the System No. 1, pressing the brick on a 4-mold upright press. In 1909 a new company was organized to take over the plant and their equipment, making some changes and adding additional equipment which was used until 1911, when they installed a wet pan for mixing and preparing their material and making a more uniform product. In 1918 they installed a 12-mold rotary table press. They are still operating, making a good brick with an annual capacity of from 8 to 10 million.

In 1905 a company was organized at Menominee, using the System No. 1, pressing the brick on a 4-mold upright press. On account of the high freight rate and low price made by other competitors the company was not able to find a market to run the plant successfully and steadily. In 1920 a new company was organized taking over the old plant, making such changes in the equipment as to enable them to reduce the cost and make a better product, and they have been able to operate their plant up to the present time with a capacity of from 5 to 8 million brick per year.

The same year a company was organized at Jackson using the System No. 1 and a 4-mold press. On account of its poor management and the raw materials not being located near enough to the market to enable them to haul or deliver their brick, they were not able to operate it at a profit. In 1912 such of the equipment as could be used was taken over by a new company and removed to a new location north of Jackson, changing the type of hydration, installing the wet pan for mixing and a 12-mold rotary table press. This company operated successfully until they were forced out of business by state competition using convict labor. They were compelled to close down and sold the equipment in 1924 to a new company which removed it to the city of Jackson, bringing them near to their trade and carting distance. They installed a bar mill for mixing their material and are operating steadily with a yearly capacity of from 5 to 8 million brick.

In 1905 a company was organized and installed a plant using the System No. 1 with a 4-mold upright press at Holland. Not being able to make a product to satisfy the trade, about 1907 they added a tube or pebble mill to prepare their material and changed their press for another make, upright 4-mold. About 1909 or 1910 they changed or installed a 16-mold rotary table press, which however, was not strong enough and did not operate properly, as they could not make a commercial brick on it. Not having sufficient working capital to continue operations they closed down selling the equipment, most of which went as scrap.

In 1907 a company was organized and a plant was built at Grand Rapids using the System No. 2 and a 4-mold upright press. Not having sufficient capital and the proper equipment to make a product to satisfy their trade, after trying to operate for two years, this company ceased operations and sold their equipment as scrap.

In 1909 a new company was organized in Grand Rapids using System No. 1 and a 12-mold rotary table press, adding wet pans for mixing the material and another 12-mold rotary table press in 1918, with a new type of hydration. In 1922 they changed over to a bar mill for mixing and preparing the material and a volumeter for proportioning the lime and sand accurately. This company has been operating steadily since it started operations, and has an annual capacity of about 20 million brick.

About 1910, a company was organized at Lansing, which purchased the equipment from a plant at Freemont, Ohio. System No. 2 was installed at a plant several miles south of Lansing. Before the plant was ready to operate the stockholders got into trouble among themselves, reorganizing with new capital, and never made a commercial brick. The equipment was sold as scrap within four years from the time of installation, the stockholders losing all they put in the business.

In 1911 a company was organized in Detroit using the System No. 1 and a 4-mold upright press. They operated for about a year, but were unable to make a product satisfactory to the trade. A new company was organized during 1912 taking over the equipment of the old company, and removing it to Rochester, changing the type of hydrator, adding wet pan for mixing and a 12-mold rotary table press. This company has been operating steadily and during 1924 made on their one press 18 million brick.

This same company in 1924 increased their capital and started to install a new plant in Detroit with the new process of hydrating lime, volumeter for proportioning the material and bar mill for preparing the mixture with two 12-mold rotary table presses. This plant began operations early in 1925 and has a daily capacity of 150,000 brick per 24-hour run.

In 1912 a company was organized which erected a plant at Kalamazoo, using the new process referred to in the early part of my article as follows: The lime was pulverized and put into a drum or shell about 6x12-ft. with an equal amount of bank sand. The drum was sealed and allowed to revolve about 30 minutes, adding hot water and steam sufficient to hydrate the lime and partially mix the material. Then it was discharged from the drum, mixed with additional bank sand and put through a continuous operating (German make) wet pan, pressing the brick on a 12-mold rotary table press. The company worked a year trying to make this system operate successfully, but were unable to do so, and it cost them a great deal of money, making it necessary to change their type of hydration, installing a wet pan for mixing and operated steadily up to the fall of 1923, when they were compelled to suspend operations not being able to compete with convict-made brick. The equipment was sold and shipped to Florida.

During 1912 a company was organized in Detroit using river sand and System No. 2, with wet pan for mixing and a 4-mold upright press. They did not start operating until the summer of 1914 and ran intermittently until about 1917. On account of the war, not being able to get fuel, and up to the early part of 1920 they reorganized several times to get rid of their indebtedness and secure additional working capital. The new company resumed operations early in 1920 and operated the plant about five months when it was taken over in the fall by a new corporation which took over the equipment, putting in new machinery and simplifying the handling of the raw material; and in 1924 added a bar mill to prepare and mix the material for their two 4-mold upright presses. This company has an annual capacity of from 15 to 18 million brick.

In 1923 a company was started and a plant erected at Pontiac, using the new type of hydration, wet pan for mixing and a 12-mold rotary table press. They are making a good product and running steadily with a yearly capacity of 8 to 10 million brick.

Gradually Beating Clay Brick

Within the last few years the manufacturers of clay brick in and near Detroit have realized that our product is here to stay and two plants have been installed and they are operating with a yearly capacity of 6 to 10 million brick each, purchasing their lime hydrated, mixing with bank sand on wet pan and pressing on a 16-mold rotary table press.

CONDENSED REPORTS OF MICHIGAN SAND-LIME BRICK PLANTS

System No. 1	System No. 2	Remarks	Reorganized	Present status	Capacity
1901 Saginaw		Operating every year		Still operating	8,000,000
	1902 Detroit	Changed to No. 1	1	Still operating	20,000,000
	1902 Saginaw	Moved to Grand Rapids	1	Not operating	
1903 Sebewaing		Operating every year		Still operating	6,000,000
1903 Sault Ste. Marie		Operated until 1908		Not operating	
1904 Sibley		Operates steadily	1	Still operating	6,000,000
1904 Manistee		Operated until 1917		Not operating	
1904 Flint		Poor equipment		Dismantled	
1905 Menominee		Operates steadily	1	Still operating	8,000,000
1905 Jackson		Moved twice	2	Still operating	8,000,000
1905 Holland		Poor equipment	1	Not operating	
	1907 Grand Rapids	Poor equipment		Not operating	
1909 Grand Rapids				Still operating	20,000,000
	1910 Lansing	Internal dissentions	1	Never operated	
1911 Detroit		Moved to Rochester	1	Still operating	18,000,000
1912 Kalamazoo		New system		Not operating	
	1912 Detroit		3	Still operating	15,000,000
1923 Pontiac				Still operating	8,000,000
1924 Detroit		New system		Still operating	6,000,000
1925 Detroit		New system		Still operating	6,000,000
1925 Detroit		New system		Still operating	25,000,000

The five Detroit plants can make annually 70 to 100 million brick.
The eight other state plants can make annually 80 to 110 million brick.

These two companies are making a good product and are a credit to our industry.

The Future

A good showing for a new industry you will agree and what about the future? To me it looks good, much better than it has for years; last year—1925—eight billion brick were used in the United States, the common brick industry is in the most prosperous condition of its history. Since 1921 there has been a steadily increased production and consumption practically all of the larger construction centers of North America.

Chicago still remains the largest producing center, making and marketing more than 1,250,000,000 brick. The Greater New York district, second, with a consumption of approximately one billion. There are sections of the country that have not shared in the general prosperity and may be caused by the failure of our manufacturers in not advertising and promoting their product. The question arises whether or not common brick is to continue as a basic material nationally and the answer must come from the manufacturers themselves. With more than six billion dollars spent last year, with a better outlook for this 1926, what are you going to do? I shall insist that the plants I am interested in are kept clean, the equipment and buildings put and kept in the best of condition, and that good help is kept to hold the factories up to capacity, then put it up to the managers and sales departments to keep the brick moving.

Other Topics Discussed

Other subjects on the program included a "Report of the Building Officials Conference," by E. W. SYMTHE, Wisconsin Brick Co., Madison, Wis., in connection with which W. H. CRUME, of the Crume Brick Co., Dayton, Ohio, pointed out the advantages and popularity, in his locality, of sand-lime brick as a portland cement stucco base. NATHAN C. ROCKWOOD, editor-manager of Rock Products, read a paper on "Present Tendencies of Trade Associations." A "Report on the Chamber of Commerce Meeting at Washington" was read by DR. A. S. WOLFE, of the National Brick Co., Washington, D. C.

A paper on the "Promotion of Standards" by RAY M. HUDSON, Department of Commerce, described the progress of standardization in general with only a reference to brick standards. Such standardization is wholly voluntary on the part of manufacturers and is useless unless whole-heartedly adopted and sold by manufacturers to their customers. It was developed in the discussion that several manufacturers, to meet local competitive conditions, are making a larger brick than the standard for common brick adopted by the various interests in conference under the auspices of the Department of Commerce. Where the new standard brick has been introduced everyone seemed satisfied, the manufacturers in particular since they can get no larger price for the larger brick; also it is possible to get 200 more brick in a truck load.

Lime of Many Varieties

L. B. BURT, head of the industrial bureau of the National Lime Association, Washington, D. C., read a paper on the subject of lime and its properties. He stressed the variation in the physical and chemical properties of different limes, and sometimes of lime from the same source. He illustrated his point by examples of the use of lime in the paper and leather industries, the efforts to make lime to meet the special requirements in each case, the use of a calorimeter to determine some of these properties of lime, and the desire of the National Lime Association staff at Washington to assist users of lime in all fields. Mr. Burt said that the elimination of differences in limes was practically impossible, not only on account of lime-plant operating difficulties, but because lime manufacturers have many different markets to supply and as many diverse requirements in lime properties or characteristics to meet. Mr. Burt thought there was plenty of opportunity for co-operation of the two associations.

A paper by H. V. JOHNSON, of the U. S. Bureau of Standards on "Sand Lime vs. Mortar Brick" defined the difference between brick made of sand and lime mortar, hardened in the air, and sand lime brick made by the pressure and steaming process. The steam treatment process goes back to 1850, although Dr. Michaelis did not patent his process until 1880.

A discussion of the ways of removing scale from cars used in the steam pressure cylinders developed the fact that at least two satisfactory methods had been discovered. One is by means of a special machine which operates like a drill press, the other a sand-blast. It would seem from the facts brought out in the discussion that the sand-blast method was preferable.

Light-Weight Building Tile

One of the most interesting features of the convention was an exhibit of light-weight building tile made by the Crume Brick Co., Dayton, Ohio, and patented by W. H. CRUME. Mr. Crume explained the experiments and processes tried in the development of these tile, which have covered a period of two years and included mixtures of cinders, lime, cement and slag. A light weight hollow tile which seemed to offer great possibilities was made of slag, lime, and kieselguhr, or diatomaceous earth. To form the tile Mr. Crume had experimented with various concrete block machines, and had finally settled upon a Blystone hydraulic press of special design as offering the greatest possibilities. All the tile were made by the sand-lime process — subjected to high pressures and steam hardened in steam-pressure cylinders or kilns.

The discussion following Mr. Crume's paper developed that several sand-lime brick manufacturers are now making hollow tile by similar processes. One producer was making portland cement tile as a side-line, and for a backing for his brick. He had tried sand lime tile and found the cost 2 cents per block in favor of sand lime, but owing to difficulties yet to be worked out he preferred to make his tile of portland cement and sand.

Freight Rates

A report of the committee on freight rates by ALLAN G. WALTON, Hummelstown-Brownstone Co., Hummelstown, Penn., was read. Mr. Walton recommended taking cases of unjust discrimination before the various state public service commissions before going to the Interstate Commerce Commission at Washington. He had also found sympathy and help by going to his local railway officials. Mr. Crume recommended the same course of action, and said this method had met with success, and the Ohio Public Utilities Commission had given a favorable decision, putting sand lime brick on the same rate basis as common clay brick. A similar case is pending before the Indiana State Public Utilities Commission, according to F. C. DALL, of the North Indiana Brick Co., Michigan City, Ind.

Research

Research came in for a lively discussion when C. H. CARMICHAEL, American Brick Co., Boston, Mass., described the work his own company had started at the laboratories of the Massachusetts Institute of Technology. Among the direct results of this research were changes in design and operation of his plant which led to immediate economies. The exhaust from his steam-hardening cylinders is now used to heat the feed-water for the boilers. Mr. Carmichael said they had not scratched the surface of possibilities in research work, and he made an eloquent plea for co-operative research by the association.

MR. CRUME also highly commended research. He said percentage of water in the sand lime mixture when the brick were pressed had a very important effect on the strength of the brick; the wet mixture required less pressure for the same strength brick as a dry mixture. He said research had also demonstrated that 6 hours' steaming made better brick than 12 hours' steaming.

"The Properties of Sand Lime Brick" were exhaustively covered in a highly technical paper by J. M. PORTER, of the U. S. Bureau of Standards, who gave the results of many recent tests. Moving pictures of the sand lime brick industry in various parts of the country were exhibited by J. W. VAN BRUNT, of Jackson and Church, Saginaw, Mich.

A good part of the informal discussion related to competition with clay brick and the extreme—unethical to say the least—methods adopted by the clay brick interests in attempting to discredit sand lime brick. There is one satisfaction to be had by sand lime brick producers, and that is, wherever sand lime brick and common clay brick compete on their relative merits, sand lime brick win out. That the common brick industry feels it necessary to resort to the tactics

they are now employing is proof enough that there is wholesome fear in the clay brick industry of the progress being made by sand lime brick.

The officers elected for 1926 are: President, John L. Jackson, Saginaw Brick Co., Saginaw, Mich.; vice-president, W. A. Symth, York Sandstone Brick Co., Toronto, Ont.; secretary, G. W. Phelps, Flint Sandstone Brick Co., Flint, Mich.; treasurer, Allan G. Walton, Hummelstown-Brownstone Co., Hummelstown, Penn.

Registration

Acme Brick Co., Milwaukee, Wis., I. G. Toepher, C. W. Wendt, Jacob Poppert, A. C. Marggraff.

American Brick Co., Boston, Mass., C. H. Carmichael.

American Brick Co., New Orleans, La., Otto Schwartz.

Atlas Sand, Gravel and Stone Co., Hartford, Conn., G. N. Dunning.

Belt Line Brick Co., Minneapolis, Minn., J. Zellie.

Bureau of Standards, Washington, D. C., J. M. Porter.

Crume Brick Co., Dayton, Ohio, W. H. Crume, R. C. Kiser, R. A. Crume.

Flint Sandstone Brick Co., Flint, Mich., G. W. Phelps.

Grande Brick Co., Grand Rapids, Mich., H. O. Joseph.

Hadfield-Penfield Co., Bucyrus, Ohio, L. Haigh.

Hummelstown - Brownstone Co., Hummelstown, Pa., A. G. Walton.

Jackson & Church Co., Saginaw, Mich., J. W. Van Brunt.

Jackson Brick Co., Jackson, Mich., J. Morley Zander.

Lakeland Brick and Tile Manufacturing Co., Lakeland, Fla., C. H. McArdle.

Louisville Cement Co., Louisville, Ky., D. M. Gray, W. F. Irwin.

Menominee Brick Co., Menominee, Mich., N. S. Myers.

Michigan Pressed Brick Co., Detroit, Mich., J. Finkheimer.

National Brick Co., Washington, D. C., Dr. A. S. Wolfe.

National Lime Association, Washington, D. C., L. B. Burt.

North Indiana Brick Co., Michigan City, Ind., U. F. C. Dall.

Plant City Brick Co., Tampa, Fla., C. W. Wilkinson.

Pontiac Brick Co., Pontiac, Mich., O. E. Boice.

Rochester Sand and Brick Co., Detroit, Mich., J. G. Schluchter.

Rock Products, Chicago, Ill., N. C. Rockwood.

Saginaw Brick Co., Saginaw, Mich., John L. Jackson.

Sand Lime Products Co., Detroit, Mich., T. C. Taylor, Lester Kotting.

Walker & Frank Brick Co., Detroit, Mich., C. M. Frank, C. F. Frank.

Winchester Brick Co., Winchester, Mass., John J. Gallagher.

Wisconsin Brick Co., Madison, Wis., E. W. Smythe.

York Sandstone Brick Co., Toronto, Can., W. A. Smyth.

Advantages of a Tidy Plant*

By A. L. Scott

Superintendent, Le Roy Plant, General Crushed Stone Co.

THE subject assigned to me, "The Advantages of a Tidy Plant," however can be largely laid to the door of Mr. Rockwood, of Rock Products, who on one of his scouting expeditions some years ago happened to visit us just after we had applied a barrel of red paint. And you know how these editors can get out a very elaborate article on a comparatively small basis.

Any effort we may have made toward plant maintenance which is only another word for plant cleanliness—has been induced by firm belief that only through a definite and systematic program of upkeep can an efficient and regular operation be assured. And this, of course, includes in addition to the equipment and buildings, the structures and grounds composing the plant. And while paint on a building or a clean yard may not increase the tonnage they certainly are easier on the eyesight and we are quite sure in the long run that it does increase tonnage by the increased interest of the operating men who are the main factors in production as they are responsible for the direction of the unskilled labor.

And this belief is based on the well-known fact that we all prefer to work under pleasant surroundings if possible and will do our best work under these conditions.

And we find the men entirely willing to co-operate on these lines and carry the idea along without special direction after once established.

And it is therefore quite clear to our mind that an attempt to make the plant look as well as possible has a distinct bearing on the labor turnover as we find that 65% of our men have been with the company ten years or more, although their work is entirely seasonable.

It also without question has a tendency to reduce accidents and as a matter of curiosity I looked it up and found that our accident ratio during last season was six minutes for every 100 man hours and were invariably of the unpreventable class that is largely due to the men's own carelessness and not because of unsafe equipment. And as you know, some of the most trivial accidents have very serious and far reaching consequences, even though every effort is made to furnish medical attention at once.

For Cost Reduction

However, to return to plant maintenance we might say that the inception some years ago was probably due to the curiosity of our general office who are continuously asking the most embarassing questions about costs. And in order to satisfy this, we were forced to do something so as to quiet our own conscience and justify our appearance on the pay-roll, and therefore attacked the power house first as this, to our mind, was one of the most important units and we happen to know a little more about it than some of the other equipment. And after overhauling the engines and boilers, we felt so well pleased with the job that we gave them a coat of paint, reasoning that no one would believe that they were in good shape inside if they were dirty on the outside. And in order to provide proper surroundings, we naturally had to paint the engine room and then it occurred to us that no one but ourselves would ever see it unless we threw out some kind of bait so we painted the building a nice bright red, which as you know, is largely used by circuses to attract attention, and cleaned up the yard to make it easy to get to the ticket wagon. We then had our trap all set out but were in a position where we only had one attraction to offer and in order to round out the show we had to extend the same procedure to the crushing plant and quarry.

Now, mind you, this was all done to satisfy this insistent enquiry of the main office about costs. And while we were open to the general public, the officials of the main office were our regular customers.

And the most unusual fact to my mind about the whole thing is that it should excite comment to clean up a stone plant, as we can see no reason why they should be different than any other enterprise as regards housekeeping and we believe it is the general practice to spend some effort in this direction. As an instance the Lehigh Valley, which passes our plant, spends considerable time and money in lining up the ballast with a straight edge, placing each stone by hand, all of which does not add to the ability of the ballast to hold the rails in alignment and is done solely for appearance and therefore must be considered of value or they would not do it. All of which further confirms the belief that we hold that a reasonable amount of housekeeping is necessary in plant operations of every kind in order to promote the security and well-being of all concerned and tends to put the balance on the right side of the cost sheet.

And I further do not wish to create the impression that I wish to pose as the only exponent of plant cleanliness in the United States or Canada, as I can assure you that I most strenuously objected to this subject assigned to me as being one which had so many angles that it was beyond my limited powers to do it justice.

And it is possible that our efforts along these lines have been promoted by selfish desire that when the time comes that the company really gets on to me and pries me loose from the pay-roll that I will at least be able to turn the plant over in a recognizable condition.

*Presented at the National Crushed Stone Association Convention, Montreal, Canada.

Stripping Nine Feet of Dirt for Twelve Feet of Gravel

Dallas Washed and Screened Gravel Co. Has a Unique Operation—Full-Diesel Power Used in Draglines and Washing Plant

THE Dallas Washed and Screened Gravel Co. of Dallas, Texas, conducts one of the most unusual operations in the United States. In fact it is so unusual that it may be called unique. This is for two reasons. So far as the writer knows, it is the only operation in the United States at which 9 ft. of top soil and clay is stripped to recover 12 ft. of gravel and sand. And it is also the only sand and gravel plant which uses full-Diesel engine power throughout the entire operation.

Of course, such an operation would not be possible unless the ground was worked in a systematic way and with careful management to keep the costs down. But both these features are present in this operation and it is profitable, despite conditions which might cause an operator in some other parts of the country to hesitate before he would undertake it.

The plant is situated five miles from Arlington which is about halfway between Dallas and Fort Worth. The deposit is a broad alluvial plain and it is probable that something like the same agencies which brought the sand and gravel to it in the first place have since covered it with clay and loam. There are two other plants in this section within a comparatively short distance, and these are all the plants that are producing washed sand and gravel on a large scale in the Forth Worth-Dallas district.

Pit-Run Materials in Correct Proportions

Sand and gravel seem to be in about the right proportions to supply the market so that there is no excess of any size to be disposed of. It appears to be a feature of the deposits in this part of Texas that the pit run material is graded about right to make a good concrete aggregate and this is one reason why so much unwashed pit run material is used. It is a curious feature of all the operations producing washed sand and gravel here, that they often sell a product which is pit run washed and screened and then recombined. And it is said to make a satisfactory aggregate. The gravel is largely made up as flints which appear to have been dissolved out of a limestone much earlier than that which now forms the main rock in this locality.

Operations have been carried on at this plant for some time but it is only quite recently that the present systematic method of excavating the material has been adopted. It much resembles the method used in the Tennessee phosphate fields. In opening the deposit the first cut makes a long trench as wide as the boom of the dragline will allow. The strippings are sidecast on the farther side of the trench. The gravel underneath is removed as fast as it is stripped by the same machine so that the dragline does not have to be moved until it is ready to strip another short section of the trench. When the end of the trench is reached (at the boundary line of the ground to be worked) the dragline starts back beginning a new cut which will double the width of the trench. The strippings from this new cut are cast into the first cut from which the gravel has been removed. The operation is clearly shown in one of the pictures. This shows the dragline after it has finished the first cut and is starting back. A pile of earth shows in the trench which is the first of the stripping from the new cut.

The company has two draglines and it would be possible to work the two in conjunction, one going ahead and stripping

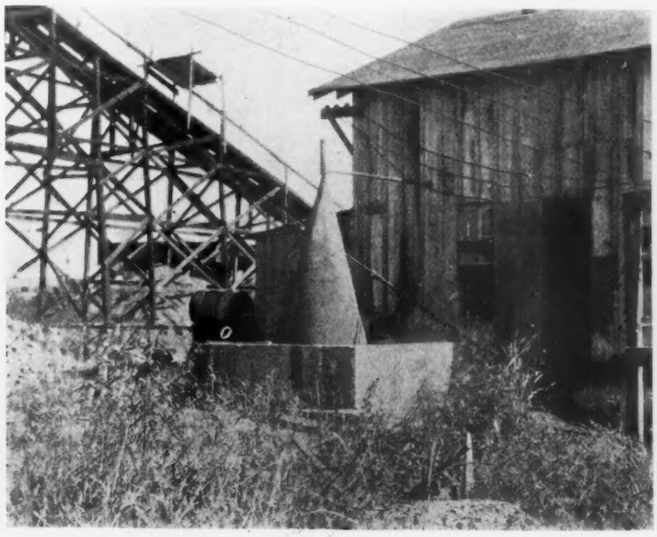
General view of the plant of the Dallas Washed and Screened Gravel Co., Arlington, Tex.

while the other dug sand and gravel. But it is considered better engineering practice to have one machine do both stripping and digging gravel, as it can alternate between the two and keep itself busy when no cars are ready to be loaded.

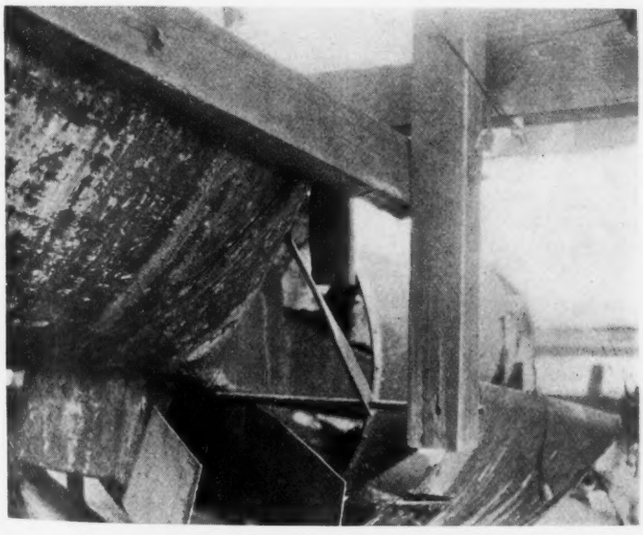
Standard gauge 50-ton cars take the sand and gravel to the plant where it is dumped into a concrete hopper which is 18x24 ft. at the top with 45 deg. sides. From this it flows to a Jeffrey 20-in. belt conveyor, with about 200 ft. centers, which conveys it to the washing and screening equipment. Two pickers remove any lumps of clay that may come along as the material passes on this belt.

There are five Gilbert screens (Stephens-Adamson) for screening and washing. The first has 3-in. perforations and the oversize is sent to waste. It consists of a small amount of cobbles (too few to pay to crush) and some lumps of clay which were picked up from the bottom by the dragline. The sizing screens which

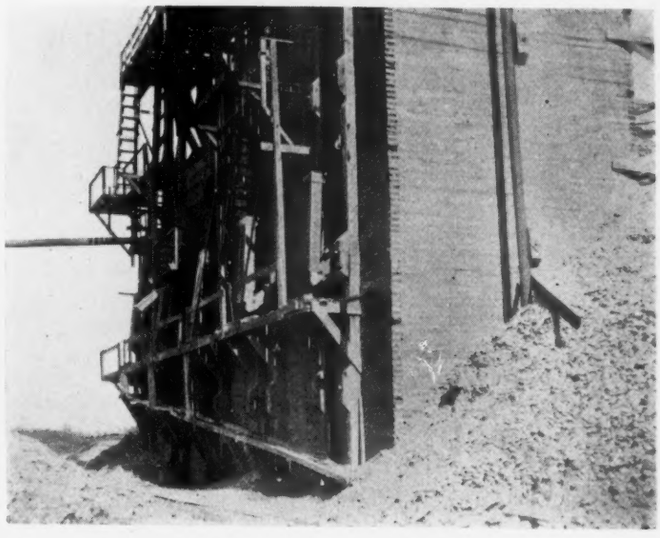
One of the company's two draglines which both strips and digs gravel



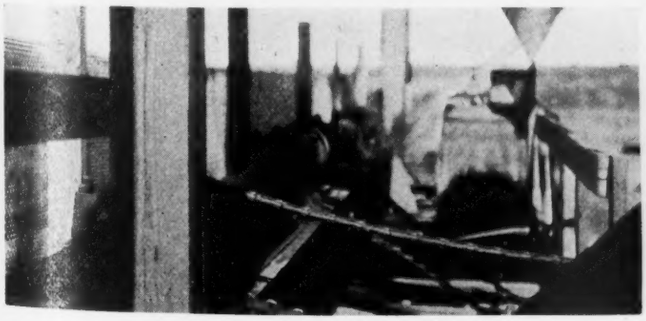
Condenser for cooling water for diesel engine



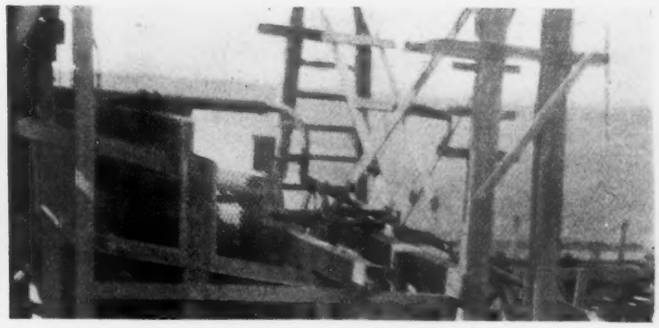
Two of the five screens for sizing and washing



Bins with loading spouts folded down



Shaft and chain drives for screens



Another view of screen arrangement

follow have 1½-in., ¾-in., 7/16-in. and 7/32 in. perforations. A ⅛-in. screen was formerly used in addition to these but is now cut out of the flow. Water is added according to the method commonly used with Gilbert screens, that of directing a stream on the material at the high point to which it is carried by the screen's revolution.

The sand which passes the 7/32-in. screen is settled in two Link-Belt cones of the Dull pattern. These make two sizes of sand, the second cone settling the overflow of the first cone.

The product goes to bins and is loaded into cars through the usual chutes and gates. The bins are somewhat unusual as they are built of "cribbing."

General view of the plant from below, showing right-angle layout

Mixed Products Principal Output

As mixed products form so large a part of the sales from this plant, special arrangements of chutes and gates have been designed to produce any combination of sizes desired. Twenty-seven different mixtures may be made although some of these, such as a mixture of the finest sand and the coarsest gravel, would never be used. However, the possibility of making any desired mixture is one that has proven itself of great value.

An illustration of this was given when the plant was furnishing gravel to a county road job. The engineer in charge tested various mixes until he found that which would give the greatest concrete strength and the plant delivered a graded product corresponding to his highest test. Cylinders from this road tested 6000 lb. and upward in compression.

Diesel Engine Power

Full-Diesel engines are used throughout. The draglines are Monaghan walkers, one No. 2T with a 75 h.p. engine and one No. 3T with a 100 h.p. engine. The engines were made by the Fairbanks-Morse Co. The same company made the 75-h.p. full-Diesel engine which generates electricity for the plant motors. This is direct-coupled to a Fairbanks-Morse 60 h.v.a. 3-phase, 60-cycle generator. Current is generated at 230 volts. In the power house there is also a 3-h.p. Type Z Fairbanks-Morse oil engine which is used for running the air compressor for starting the larger engine.

This Diesel power is liked very much and has proven itself satisfactory in every way for operating the draglines. It is, of course, more economical than purchased power, but aside from this it has advantages in dragline operation.

The No. 2T dragline is used for handling materials in and out of stockpiles. The company carries a great deal of material in stockpiles as a matter of business policy and finds that it pays well to do so.

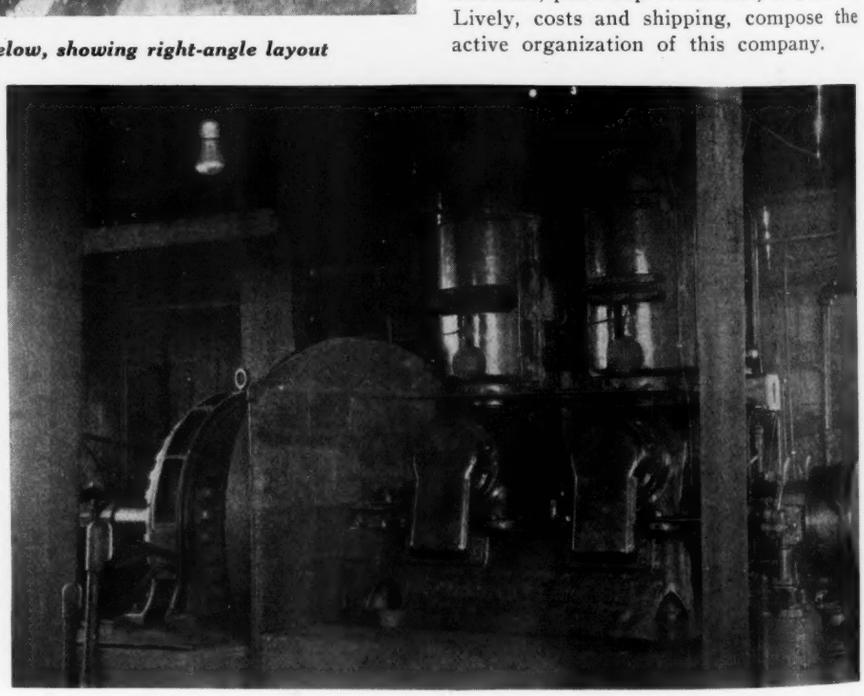
The output of the washing plant is 40 cars per day. In addition to this there is a considerable amount of unwashed material shipped for railway ballast, at times, amounting to 50 cars per day.

For switching cars and for working between the dragline and the plant the company employs two steam locomotives. One of these is a 65-ton Baldwin, the other a 50-ton American.

Dallas is famous throughout the United States for two of the finest reinforced concrete buildings which have been erected. One of these, the Medical Arts building, is two or three years old, the other, the Santa Fe building, was completed in May, 1925. It is a very large building and it took 3600 cars of washed sand and gravel to build it. The aggregate for the Santa Fe building was furnished by the Dallas Washed and Screened Gravel Co.

The plant was designed by Clyde Kraft and E. Ross Chamblin, designing architect and structural engineer.

Jean H. Knox, manager; Clyde Kraft, sales manager; C. N. Wylie, office; L. G. Groomer, plant superintendent, and R. O. Lively, costs and shipping, compose the active organization of this company.



Diesel engines for prime movers

Sand and Gravel, Dolomite, Discussed by Mining Engineers

Session of the American Institute of Mining and Metallurgical Engineers at New York City Devoted Mostly to Sand

SAND — molding sand, special sand, and commercial sand — was the main theme of the session on non-metallics of the American Institute of Mining and Metallurgical Engineers. Dr. Herman Ries, chairman of the committee on non-metallics, acted as chairman of the meeting, and Dr. Oliver Bowles, secretary.

Molding Sands

A paper by R. M. BIRD, of the George F. Pettinos Co., Philadelphia, Penn., entitled "Mining and Preparation of Eastern Molding Sands" was illustrated by some very interesting lantern slides showing operations in the Albany, N. Y., and New Jersey deposits.

The Albany sands to a great degree are taken from farms. Excavation is by hand shovels, loaded in trucks and hauled (average distance five miles) to railway stations, where it is loaded in railway box cars. The reason hand shovels are used is because no machine has yet been devised which will excavate the sand with any degree of uniformity. It depends entirely upon the man on the job. Albany sands are very easy to dig.

The New Jersey deposits range from coarse gravel to sand as fine as 100 mesh. Overburden is from 3 to 6 ft. Gasoline shovels and motor trucks are used for removal of this overburden. In this connection Mr. Bird showed a very interesting table showing relative costs of operating 1-ton trucks as against 2½-ton trucks. In the New Jersey section the lighter trucks are used.

COMPARATIVE COSTS OF 1-TON TRUCKS AND 2½-TON TRUCKS FOR STRIPPING SAND DEPOSITS

Comparative	Daily	Costs
Rated capacity	2½-ton	1-ton
Carrying load	5 tons	1¾ tons
Interest, 6%; depreciation, 25%	$6.50	$.70
Driver	5.00	4.00
Gas and oil	2.20	1.00
Tires	1.50	.90
Repairs	.60	.70
Total operating	$9.30	$7.60
Sum total	$15.80	$8.30
Cost per ton load	$3.60	$4.75

Note—$1.27 engine repairs.

South New Jersey district is essentially a steam-shovel district, but they have tried gasoline shovels and have found this type of equipment more economical than steam. Using gasoline shovels obviates the necessity of a licensed engineer and fireman, does not require early firing, no trouble with coal or water. They have found the repair costs in gasoline shovels rather excessive, but think this is only temporary.

FOLLOWING IS A TABLE SHOWING COMPARATIVE OPERATING COST BETWEEN STEAM AND GASOLINE SHOVELS, SAME DIPPER CAPACITY—ONE YARD

Comparative	Daily Steam	Cost Gas
Interest, 6%	$3.50	$3.42
Depreciation, 10%	6.25	5.75
Total capital acct.	$9.75	$9.17
Operation	$5.50	$5.50
Fireman	4.00	.00
Coal	2.90	.00
Gasoline	.00	4.10
Coal, gasoline, water, labor	.60	.10
Repairs	12.70	10.30
Total operating	$25.70	$20.00
Sum total	$35.45	$29.17

Mr. Bird showed slides of typical plant operations in the New Jersey district. Sand is loaded by shovel in 4-yd. narrow-gage cars and hauled to plant by locomotives. Cars are side-dumped into concrete trenches located between the tracks. The trenches have bottomless dragline scrapers, which carry the material to belt conveyors. From here it goes to screens and storage. Gas shovels and trucks are used to load from stockpile. Considerable of the materials is carried by barges to market. The company has seagoing diesel-engine tugs to haul barges.

Desirability of Standard Tests

DR. H. RIES, Cornell University, Ithaca, N. Y., discussing "The Use of Standard Tests of Molding Sands" said:

Within the past three years, the Joint Molding Sand Research Committee organized by the American Foundrymen's Association and the Engineering Division of the National Research Council, through its Sub-Committee on Tests, has devoted considerable time to this problem, and, with financial assistance from the former organization, has supported much necessary research with the object of obtaining reliable data on which the formulation of standard methods of testing could be based. The tests recommended, together with the method of making them, have been described elsewhere; they include tests for measuring the fineness, permeability, bond, and dye absorption. There still remain to be developed standard methods for determining, among other properties, the refractoriness and life of the sand, for expressing the grade or texture, by a single figure if possible, for testing the properties of core sands or core mixtures, etc. Much progress has been made toward formulating these.

Of prime importance however is the proper use of the data obtained through the medium of standard methods of testing, and I wish to stress this point particularly because there exists some misconception on the part of not a few.

The writer has frequently been asked to state what permeability, bond strength, etc., a sand should show if it is to be used for casting iron, brass, or some other metal. This question cannot be answered definitely for several simple reasons. Sands showing a fairly wide range of certain properties at least, can be used for casting any one of these metals, and the type of sand used is governed in part by the fact that the size alone of the casting will affect the type of sand to be employed, or artificial causes, such as the method of venting the mold, may exert a controlling influence.

It is possible, and quite probable, that some day we shall be able to state, for example, that a sand to be used for brass castings up to, say, a certain size, should show a certain range of permeability, bond strength, and fineness, but we cannot do this until we have more data. But though the accomplishment of this may be delayed, it does not in any way detract from the value of the standard tests. On the contrary, their widespread acceptance and employment has demonstrated their usefulness in other directions. They can and should be used both as a check and as a form of specification, although this last word may not be altogether satisfactory to some.

There is apparently no valid reason why the consumer should not demand a sand showing a certain range of permeability, bonding strength, dye absorption, and texture. It seems reasonable to assume that the producer can meet this demand by mining a sand of uniform quality; or, by mixing two sands, produce a blend of the requisite qualities. Some foundries even now are purchasing sands on this basis, and in the writer's opinion this practice will spread. It represents a form of specification.

The other use of standard tests will be in the foundry,* where the foundryman finds that the best results are often obtained by keeping the properties of his heap sand close to certain values of moisture, permeability and bonding strength. These values may be originally obtained by using a single sand or a mixture of sands, and daily checks of the sand heap are made to determine how close it is running to requirements. If there is a deviation, the necessary correction can be made by the addition of some new sand or by regulating the moisture content, if that is necessary, because it is known that both permeability and bond strength vary with it. We thus have a form of specification that the foundry worker must meet. Testimony by foundrymen now using these standard control tests in their daily work shows that many dollars are saved, by reducing defects caused by the sand being in a bad condition.

The value of the use of such standard tests is, furthermore, brought out by the fact that there are over 100 standard permeability apparatus in use, and their employment is

*H. W. Dietert, Commercial Application of Molding Sand Testing. Amer. Found. Ass'n preprint 425 (1924). F. S. Wolf, and A. A. Grubb: Molding Sand Reclamation and Control Experiments. Ibid, preprint 430 (1924).

spreading. They are employed by both producers and consumers.

Much confusion still exists as to the grading of sands. The term grade refers solely to the texture of the material and at present there is no uniformity in expressing it. Some producers grade their sand according to numbers, others according to letters, each adopting his own series. Even in the same district, the same numbers may not represent the same grade when used by different producers; such a situation calls for a speedy remedy. There is absolutely no good reason, why six sands of the same grade, produced by as many firms in separated parts of the country, should not be known by the same number or letter. Such uniform grading is of particular value to the foundryman who may desire to obtain sand from a source not hitherto drawn on. Fortunately, a sub-committee of the American Foundrymen's Association is now working on this problem, having as a basis for study the fineness tests of several hundred sands that have been collected in many different areas of the United States, by the various state geological surveys co-operating with the American Foundrymen's Association.

Glass Sands

CHARLES R. FETTKE, Ph. D., Pittsburgh, Penn., described "American Glass Sands, Their Properties and Preparation," in an exhaustive paper, in which he said:

According to the committee on standards of the glass section of the American Ceramic Society, the chief criterion for a good glass sand is that it should be practically all silica and contain very litle iron. The sand must not be contaminated with stripping dirt or contain any crushed stones or pebbles. These impurities are often insoluble in the melting glass, producing "stones." The committee working in co-operation with the U. S. Bureau of Standards has drawn up the following tentative specifications for silica sand for glass-making:[1]

PERCENTAGE TOLERANCES IN COMPOSITION ALLOWED
(Based on ignited sample)

Quality	SiO_2	Al_2O_3	Fe_2O_3	CaO+MgO
1	±0.1	±0.05	±0.005	±0.05
2	±0.5	±0.1	±0.005	±0.05
3	±1.0	±0.5	±0.005	±0.1
4	±0.5	±0.1	±0.005	±0.1
5	±1.0	±0.5	±0.005	±0.1
6	±1.0	±0.5	±0.05	±0.1
7	±1.0	±0.5	±0.05	±0.1
8	±1.0	±0.5	±0.1	±0.1
9	±1.0	±0.5	±0.1	±0.1

The committee on standards of the glass section of the American Ceramic Society has proposed tentative specifications[2] in regard to grain size for glass sands. The sand shall be prepared so that the size of grains shall be rather uniform and be within the limits set in the following table:

LIMITING PERCENTAGES OF VARIOUS SIZES OF SAND GRAINS

	Not more than per cent	Nor less than per cent
Through a No. 20 screen	100%	
Through a No. 20 and remaining on a No. 40 screen	60	40
Through a No. 40 and remaining on a No. 60 screen	40	30
Through a No. 60 and remaining on a No. 100 screen	20	10
Through a No. 100 screen	5	

Screen tests shall be made with sand dried at 110 deg. C., using United States Bureau of Standards standard screen sizes.

The following screen tests on four typical washed and dried American glass sands were made by the writer in 1915, using a set of Tyler standard screen scale sieves:

RESULTS OF SCREEN TESTS IN FOUR TYPICAL WASHED AND DRIED AMERICAN GLASS SANDS

	From the Oriskany sandstone at Mapleton Depot, Huntingdon Co., Pa.	From the Oriskany sandstone at Vineyard, Mifflin Co., Pa.	From the Pottsville sandstone at Kennerdell, Venango Co., Pa.	From the St. Peter sandstone at Ottawa, La Salle Co., Ill.
Through 10-mesh and caught on 14	.....	.....	.42	.....
Through 14-mesh and caught on 20	.07	.05	.78	.04
Through 20-mesh and caught on 28	1.59	1.23	2.18	2.16
Through 28-mesh and caught on 35	13.11	4.88	7.28	19.81
Through 35-mesh and caught on 48	61.71	34.80	30.75	38.04
Through 48-mesh and caught on 65	20.25	41.03	37.06	14.19
Through 65-mesh and caught on 100	2.79	15.04	19.93	10.15
Through 100-mesh and caught on 150	.16	2.09	.85	6.66
Through 150-mesh and caught on 200	.03	.49	.10	3.68
Through 200-mesh and caught on pan	.01	.16	.03	4.76
Totals	99.72	99.77	99.38	99.49

PERCENTAGE COMPOSITIONS OF SANDS OF VARIOUS QUALITIES
(Based on ignited samples)

Quality	SiO_2 Max.	SiO_2 Min.	Al_2O_3 Max.	Al_2O_3 Min.	Fe_2O_3 Max.	Fe_2O_3 Min.	CaO+MgO Max.	CaO+MgO Min.
First quality, optical glass	.....	99.8	0.1	.....	0.02	.....	0.1	.....
Second quality, flint glass, containers and tableware	.....	98.5	0.5	.....	0.035	.....	0.2	.....
Third quality, flint glass	.....	95.0	4.0	.....	0.035	.....	0.3	.....
Fourth quality, sheet glass, rolled and polished plate	.....	98.5	0.5	.....	0.06	.....	0.5	.....
Fifth quality, sheet glass, rolled and polished plate	.....	95.0	4.0	.....	0.06	.....	0.5	.....
Sixth quality, green glass, containers and window glass	.....	98.0	0.5	.....	0.3	.....	0.5	.....
Seventh quality, green glass	.....	95.0	4.0	.....	0.3	.....	0.5	.....
Eighth quality, amber glass, containers	.....	98.0	0.5	.....	1.0	.....	0.5	.....
Ninth quality, amber	.....	95.0	4.0	.....	1.0	.....	0.5	.....

In commenting on the above, the committee states that in view of the increasing use of alumina in a glass batch and of the varying amounts of iron allowable in green or amber glass, sand of lower grade may be used by many manufacturers. The above specifications show a variety of qualities and state more or less definitely the types of glass they may be used for. The quality number is not to be interpreted necessarily as an index to the value of the product.

Although glass sands may vary considerably in composition, depending on the type of glass that is to be made, it is highly desirable, and in most cases imperative, that there shall not be very much variation from shipment to shipment. The committee has proposed the tolerances in the accompanying table.

Dr. Fettke described the effects of the various impurities in detail. As to size of sand grains he said:

The shape of the sand grains, Dr. Fettke said was not important. He described the preparation of glass sand, which operations are of course familiar to Rock Products readers. He gave the following summary:

In 1923, only 1.4% of the total sand and gravel produced in the United States was sold for glass-making purposes but, on account of the higher price that glass sand commands as compared with other types, its value represented 4.1% of that of the total ouput.[3] West Virginia, during that year, produced 25% of the total output; Illinois, 24%; Pennsylvania, 17%; New Jersey, 9%; and Missouri, 7%. The average price per ton received for the total output of the United States during that year was $1.84; for West Virginia, $2.30; for Illinois, $1.57; for Pennsylvania, $2.06; for New Jersey, $1.64; and for Missouri, $1.40.

The glass industry of the United States is well located with respect to the above sources of sand. Sixty-two per cent of the total value of the glass produced in 1919[4] came from factories located in the above five states and the major portion of the remainder came from adjacent states. The reserves of high-grade glass sand in the Eastern United States and the Mississippi Valley region are large. On the Pacific Coast, however, no deposits capable of yielding a good quality of glass sand have thus far been discovered. Some of the California glass plants import Belgian sand. During 1924 this amounted to 5775 long tons. The sand is brought into the California ports as ship ballast and hence is sold at a very low price.

Commercial Sand and Gravel

EDMUND SHAW, editor of Rock Products, contributed a paper entitled "Washing and Sizing Sand and Gravel," in which he summarized current practice, thoroughly familiar to regular readers of Rock Products.

Special Sands

W. M. WEIGEL, mineral technologist, U. S. Bureau of Mines, Washington, D. C., read a paper, "Preparation and Use of Industrial Special Sands," which covered in a general way the same subject as treated in two previous issues of Rock Products, the most recent one being February 6, when Mr. Weigel's paper at the National Sand and Gravel Convention was published. The possibility of recovering valuable by-products from sand and gravel plant operation, Mr. Weigel touched on as follows:

In the preparation of so cheap a commodity as sand, a possbile recovery of valuable by-products would hardly seem probable. Although this is true for most plants, it is believed that there are exceptions worthy of investigation. At some plants preparing a high-silica sand for various purposes, the wash water is settled and the fines marketed for special grades of molding sand, surfacing for tennis courts and sand for other uses. Also, it is believed, possible uses exist for the oversize screened out of some special sands, which are now thrown away as waste. In most plants, of course, whether the tonnage of such by-products is sufficiently worth while is often a question.

At a plant in New Jersey preparing glass sand from a bank deposit, two grades of glass sand are prepared. The first, which is washed in the ordinary way, is suitable for common clear bottle-glass. For the best grades of crown glass for bottles, this

[1] Proposed Tentative Specifications for Silica Sand for Glass-making. Bull. American Ceramic Soc. (1923) 2, 182.

[2] Bull. American Ceramic Soc. (1923) 2, 184.

[3] A. T. Coons: Sand and Gravel in 1923. Mineral Resources of U. S., Part II (1923) 152.

[4] Fourteenth Census of U. S., 1920 (1923) 8, 388.

washed sand is passed over James concentrating tables to remove the heavy minerals.

Rare Minerals in Sand

A partial analysis[1] of the washed sand, is as follows:

	Per cent
Ferric oxide (Fe_2O_3)	0.07
Titanium dioxide (TiO_2)	0.129
Aluminum oxide* (Al_2O_3)	0.34

*The Al_2O_3 contains any ZrO_2 that may be present

A partial analysis of the washed sand after tabling is as follows:

	Per cent
Ferric oxide (Fe_2O_3)	0.03
Titanium dioxide (TiO_2)	0.032
Aluminum oxide* (Al_2O_3)	0.33

*The Al_2O_3 contains any ZrO_2 that may be present

The analysis of the concentrates, or material removed in tabling, is as follows:

	Per cent
Silica (SiO_2)	7.7
Alumina (Al_2O_3)	4.0
Ferric oxide (Fe_2O_3)	24.2
Titanium dioxide (TiO_2)	52.8
Zirconium oxide (ZrO_2)	9.8

With the ferric oxide content as a basis of calculation, 100 tons of sand would yield approximately 330 lb. of concentrates; with the titanium oxide content, 367 lb. of concentrates; say an average of 350 lb. A petrographic examination of the concentrate showed it to be made up of limonite, ilmenite, rutile, zircon, rock fragments and quartz. It is difficult to estimate the commercial value of this product as its value would depend on the ability to separate the different minerals into marketable products. This method of cleaning sand on tables might make possible the development of deposits not now workable. It is at least an interesting possibility.

Possible Fields for Research

Possible lines of research on special sands naturally group themselves under two heads: Preparation and utilization.

Preparation.—Under preparation there is ample room for study of efficient methods of washing, screening and drying. The best methods for these different processes have not yet been found for all conditions. The common practice is, of course, the usual procedure of adopting methods and equipment that have been used in the given district. Preparation studies would also include investigations of possible uses and methods of treatment of present waste products at sand plants, either as special sands or the waste products from the preparation of certain sands as mentioned under the tabling of glass sand in New Jersey.

Utilization.—Studies on the utilization of special sands would probably best be devoted to methods of testing physical properties for suitability for specific uses, with possibly some effort given to finding new uses. This latter, however, is believed to be of secondary importance. Specific problems that suggest themselves are, the relative advantage of sands of rounded and of angular grain for the different abrasive uses; a method of determining the toughness or durability of abrasive sands; a method of determining the abrasive value of sands; and relative advantages of a closely sized and unsorted sand for certain abrasive purposes.

A more rational method of defining the size and grading of filter sands ought to be devised, although the present method is very firmly established by usage among sanitary engineers. The sand producer, however, would welcome a more direct method. The relative advantages of better filtering of rounded-grained sand as compared with the greater surface area of angular-grained sand and the effect on the filtered water have never been definitely determined.

These and many other special problems make an interesting field for investigation. They cannot all be solved at once. Probably the accumulation of information from experience will decide most of them before they are solved by direct attack.

[1] All analyses were made by the U. S. Bureau of Mines.

Magnesia from Dolomite

The titles of the two other papers read at this session were "Pyro- and Hydro-Treatment of Magnesite and Dolomite," by PROF. HUGH M. HENTON, State College, Pullman, Wash., and "Borate Deposits Near Kramer, California," by HOYT STODDARD GALE, Los Angeles, Calif.

Prof. Henton's paper covered the result of an investigation made in association with Dr. Charles H. Fulton in 1918 and 1919, to determine methods of utilizing, in the manufacture of basic refractories, certain domestic resources in magnesites, dolomites, and dolomitic limestones. Some of the subjects covered in the paper are the separation of lime from magnesia in dolomite, the uses of products and by-products, the utilization of flue gas. His conclusions were as follows:

Conclusions on Separation of Lime from Magnesia

First, the dolomite may be semi-calcined in a rotary kiln. The calcining can be regulated to give fuel economy, proper calcines, and the best possible CO_2 content in the kiln gas.

Second, gas cooling is practicable with waste-heat boilers and other water devices because of the great heat capacity of the water.

Third, dust recovery from the gases after cooling, is practicable by means of filters. For cool gas the filters similar to those put out by the Dust Recovering and Conveying Co. seem the best.

Fourth, for brick or other products where purity is not essential, the dust will not necessarily be a deteriment in the carbonator. It may help by acting as a catalyzer or gas carrier.

Fifth, the CO_2 from the stone and that from the fuel can be collected, compressed, and used to convert the MgO to a compound soluble in water.

Sixth, carbonation and bicarbonation are possible in four stages or less.

Seventh, the solution containing the dissolved MgO can be decanted, filtered off, and the residual $CaCO_3$ washed. The separation can be effected practically.

Eighth, boiling the filtrate will precipitate a basic magnesium carbonate

$$4MgCO_3.Mg(OH)_2.5H_2O.$$

The CO_2 given off in boiling can be recovered.

Ninth, the magnesium basic carbonate and the lime carbonate residue can be dried and calcined readily in a rotary kiln.

Nova Scotian Slate Deposits To Be Developed

THE Acadia Slate Co. has been organized to develop the extensive slate deposits lcoated in King's County, Nova Scotia, and it is prepared to proceed with the development work at once. The deposits are located between New Minas and White Rock, and the width of the belt is reported to be about 900 ft. The samples are reported upon as comparing favorably with those from the Vermont slate quarries.

Huge Slag Pile To Be Worked for Road Stone

MILLIONS of tons of slag, the accumulation of a past generation when blast furnaces flourished in the Allentown, Penn. section, will be reclaimed and will be used for the building of roads.

The Duquesne Slag Products Co. of Pittsburgh, Penn., is reported to have completed a survey of the big bank and is devising plans for one of the largest and most modern crushing plants of the industry. The company operates a crusher on the Crane Co.'s slag tip at Catasauqua, Penn. the major portion of which has already been removed.

The new plant will enjoy excellent shipping facilities with track connections with the Central Railroad of New Jersey and the Lehigh Valley Railroad and loading facilities for barges on the Lehigh Canal. It will be within easy trucking distance of Allentown, Bethlehem and surrounding towns, a condition which may be greatly improved by the construction of the proposed Tilghman street bridge.

The company, with main offices at Pittsburgh, is one of the pioneer producers of air cooled, blast furnace slag, in commercial sizes, and at present has plants located in Pottsville, Birdsboro, Temple, Coatsville, Catasauqua and Easton, in Penn., and at Wharton, N. J., in addition to a number in the Pittsburgh district.—*Allentown (Penn.) Chronicle.*

Vermont Feldspar Deposits to Be Worked

AN excellent deposit of feldspar has been opened recently by H. H. Lewis of Chester, Vt., in the "Thebo" district near North Chester. The rock is said to be unusually free from impurities and especially suitable for the pottery trade. A large Trenton, N. J., firm has already contracted for a considerable portion of the output.

The 23-acre deposit is overlaid with micaceous rock to about 10 ft., but below this level it is said the rock is of high quality. While the depth of the deposit is more or less problematical, Prof. Jacobs of the University of Vermont, who visited the feldspar deposit last year on the invitation of Mr. Lewis, believes the vein goes down 150 ft. or so, narrowing to a V-shaped apex at the bottom, in common with many similar rock deposits.

Mr. Lewis has installed mining machinery, including air compressors, pneumatic drills, engines, etc., and will soon start the shipments of the crude feldspar to the Trenton pottery manufacturers.—*Woodstock (Vt.) Standard.*

How to Increase Lime-Kiln Output

By a Lime-Plant Superintendent for Lime-Plant Superintendents

By A. O. Deringer
Oak Harbor, Ohio

WE often hear lime men and lime-plant operators bemoan the fact that their kilns are not producing the amount of lime they used to produce, or are not producing the tonnage promised them by the builders, and quite naturally they condemn the builder and his particular type of kiln.

To be sure the kilns are not producing the amount of lime they used to produce nor the amount the designer and builder claimed for them. Wait until you have finished reading this article, then draw your own conclusions.

A good many producers of lime have a just cause for complaint for a lack of tonnage. Some have no cause or reason for complaint because their folly and lack of proper supervision is the chief reason for a falling off in their tonnage.

Before I go any further with this discussion I want to state that certain conditions exist now, especially in the human element end of the operation that were almost entirely absent years ago, which render the control of certain phases of the operation a little more difficult now than formerly. But with proper knowledge and foresight these can be greatly reduced if not entirely eliminated.

Every man in the lime industry knows that since the death knell was sounded over the old-fashioned pot kiln, and since the advent of the shaft kiln, the improvements in the methods of burning lime have been few, if they can be classed as improvements at all.

To be sure the major portion of lime producers have passed from the wood fuel stage to gas, oil, or coal. This change cannot rightly be termed an improvement, but a condition brought about because of necessity.

There have been some changes made in the styles of furnaces, because of the change in fuel. Then, too, there have been new-fangled methods for drawing the kilns. But the prime principle of burning lime is the same now as it was when the shaft kiln first came into use.

There have been different principles advanced in the interior construction of lime kilns, but not in the ulterior method of burning lime.

I am not going to deal with any scientific facts for what will it aid a good many lime producers? As all those who have come up through the ranks, unless they have had technical training, will not know the meaning of these terms, and if they did, and tried to follow out a scientific course of burning lime and overlooked the prime essentials and the use of plain common sense they would not be benefited one iota.

Editor's Note

THIS is the first of a series of articles written by a well-seasoned lime-plant superintendent. It does not raise any new points in regard to lime-plant efficiency, but it drives home some points in a way that ought to impress every owner and superintendent of a lime plant.

Both the author and the editors will welcome comment, criticism, and suggestions. The editors hope that this is but the beginning of literature on rock products manufacture by actual operating men. —The Editors.

Hit-and-Miss Charging

If you visit some of the lime plants today and see the material they charge their kilns with and the product that comes out you need not wonder why they complain about a falling off in their lime tonnage. Nature is greatly insulted when you charge a kiln with a hit-and-miss conglomeration that ranges from stone of two-man size to stone the size of walnuts and expect the kiln to produce a good tonnage of uniform burned lime.

Now, Mr. Lime Man, just stop and analyze such a condition thoroughly and arrive at your own conclusions. I will set down what I think takes place and the ultimate results. If I come within 50% of being right, neither of us wins. Because you lose if you allow such a condition to exist and to continue.

Draft Problem—First, Last, and All the Time

The first serious condition that takes place and a condition that is a serious handicap to production is that the draft of the kiln is greatly retarded for the reason that the small stone goes to fill the voids. The voids are very necessary and essential for the proper burning of lime because they permit sufficient draft to circulate through the kiln to aid combustion and to carry the heat higher into the calcining zone. Then, too, the large stone alone do not leave so many voids as a uniform grade of smaller stone.

It is very necessary in order to produce the maximum amount of lime that the kiln have a good uniform draft that will keep an even temperature well up in the calcining zone.

Second—The large stone moving down along the inner wall of the kiln is very injurious to the lining, especially in a kiln that has been repaired and has patches that protrude beyond the rest of the wall; for when these stone move down along the wall of the kiln under a heavy pressure they often do serious damage.

Third—The quality of the lime from a large and small stone mixture is inferior. The small stone make an overburned product and the large stone are from one-third to one-half core, that goes to reduce the already reduced tonnage, and must be returned to the kiln to be reburned.

Fourth—There is a waste of labor to handle the core after the good lime has been salvaged.

In addition to the reasons already ascribed for reduced production of lime kilns there is still another deserving of mention, viz., the use of crusher produced stone. These stone are usually loaded from a bin that contains an abundance of small stone, commonly known as chips, that are caused by the stone dropping from the chute on to a pile of stone where innumerable small pieces or chips are knocked off, which eventually find their way into the kiln and cause serious handicaps to the proper burning of lime.

There is still another objection to this method, especially in a quarry that has large deposits of bastard material, which should be sorted out before the stone enters the kilns, in order that the inferior lime produced from it will not enter the finished product and cause serious trouble.

By this method of producing the stone it is difficult to keep out this bastard material and it is often the cause of serious complaints from the consumers of the lime.

These are some of the main reasons that go to reduce production, increase costs, and go toward making an inferior product.

If you know of any more causes you are

at liberty to enumerate them, draw your own conclusions, and charge yourself with the results.

Uniform Size of Stone Important

In order to get the very best possible tonnage and the very best quality of product and at the same time prolong the life of your kilns I think you will agree with me that if a uniform clean quality of stone, say, from 4-in. to an 8-in. cube were used and the kilns kept full to the top at all times the result would be surprisingly in your favor.

Some one will say this can't be done with our modern methods of producing stone.

I care not what method of procuring your stone you use, whether the hand-broken and hand-loaded, or the crusher product.

In the former there is no reason for not having a uniform quality of good limestone. If your costs will increase slightly by exacting more care and caution in its selection I think the returns will justify such action. If the latter method is resorted to I think the results that could be obtained would justify scrapping enough equipment to provide as nearly as possible a uniform product for your kilns, and the results would be decidedly in your favor.

Now, after everything that has been suggested is done, and the results are not what has been claimed or have not come up to expectations, there is one more phase in the operations that needs serious study and attention, which a good many men overlook, or if they discover it, they too often pass it up as one of the existing evils that can't be overcome.

Why Night Draws Are Not Up to Day Draws

Several months ago a lime man told me that he was having trouble in maintaining a uniform output throughout the entire 24 hours. He claimed that his daylight draws were much better than those at night, that each succeeding night draw was worse than the previous one, and he placed the blame on his men. He said they were careless and disinterested and did not draw the kilns as they should have been drawn.

It is possible that was some of the trouble, but I will venture that had he analyzed conditions correctly he would not have been so ready to place the blame on his workmen.

Right here is where the employe comes in for serious criticisms due to the lack of proper foresight or indifference on the part of the employer or himself. In the majority of plants that were constructed before the shaker grates came into use, you will find deep furnaces with the straight 1¼-in. square grate bar.

Now in the majority of plants it is a universal rule to clean the fires once in 24 hours. This procedure usually takes place some time after the first morning draw and continues until it is completed.

The method of cleaning where the above mentioned grate bar is used consists of taking out one-half of these grate bars at a time and cleaning out one side of the furnace, then raking a clean fire over to the cleaned portion of the grates, and when there is sufficient volume of fire on the cleaned side, the process is repeated on the uncleaned side.

A Constantly Deteriorating Firing Condition

Let us analyze the condition of the furnace before the fires are cleaned. Immediately after cleaning on the preceding day and for a greater part of that day the combustion in the furnace is as nearly perfect as it is possible to have it. In a good many operations the firemen have a set time for firing, varying from twenty minutes to one-half hour. They then deposit four, five, or six, or whatever number of shovels of coal they have as a standard, into the furnace at one firing, regardless of whether it requires that number or not.

Now, since shortly after the fires are cleaned there is almost perfect combustion in the furnace, and the coal is all consumed, we have an ideal condition in the kiln, provided the aforementioned faults relative to the material to be reduced to lime have been remedied. This should produce the best possible results. But after this process of firing has continued for 24 hours without any means of disposing of the ashes in the furnace, we have a very unfavorable condition, for the deposit of ashes and clinkers on the grate makes it utterly impossible for the furnace to get any draft, and as each succeeding deposit of coal merely adds just that much more and eliminates any possible semblance of a draft.

I have seen it necessary to use bars and sledges to break up the clinker deposit in the kiln furnaces. From such conditions do you wonder that the night draws in lime plants fall away below those of the day time?

If the man who complained to me had stopped to analyze his own individual trouble I think he would have found a remedy for the most of them.

Just how does the condition in the furnace affect the output?

We have stated that shortly after the fires are cleaned there is almost perfect combustion; that is, the coal in the furnace will be consumed in a manner to throw off the greatest amount of energy. The burning coal can be regulated by opening or closing of the draft doors or dampers, according to the heat required to properly calcine the largest possible amount of stone in the kiln in a given time.

When the furnace becomes filled with ashes and there is a clinker deposit on the grates, so there can be no regulation of the draft because of the absence of it, we have a condition that is not conducive either to quantity or quality production, for it is impossible to give the flame the impetus needed to produce satisfactory results. We can readily deduce from this that each succeeding draw will suffer because of the conditions enumerated. Consequently as each draw suffers so the total daily output will suffer.

I am, however, happy to say that the foregoing conditions are not the universal practice among lime men, but are still the practice in many plants.

Shaker Grates a Godsend

I am not soliciting business for shaker grate manufacturers, but if every lime producer would stop and give his firing conditions serious study he cannot help but conclude that that type of equipment is a godsend and the sooner he avails himself of the opportunity the sooner will his earnings increase.

Anything that will enable him to agitate his grates and dispose of the residue in the furnace and eliminate the clinker formation and enable him to regulate the draft as nature intended has gone a long way to improve his conditions.

Some men will tell you: "We poke our fires to prevent the formation of clinker." Pray tell me how is a man going to agitate the deposit in a furnace 16 or 18 in. deep without seriously affecting his fires by continually mixing ashes with his live coal?

I have seen them use a slice bar and break up the crust that forms after a fresh deposit of coal, but that is as far as that practice goes.

More Articles to Come

I have discussed at some length two of the most important causes that tend toward reducing the output of lime kilns. There are still several other important causes that tend toward influencing the output of lime plants, but the two I have mentioned I think deserve first attention, and for fear of enumerating too many at one time we are apt to give consideration to the minor ones first and overlook the most serious.

Suffice it to say that if an operator will give due heed to the two points I have mentioned and try to remedy them as best he can he will be on the high road to better things by the time the succeeding article appears to give him another jolt.

Ontario Gypsum Company Building New Plaster Mill at Montreal

THE Ontario Gypsum Co. of Elora, Ont., and Paris, Ont., have started the construction of a one kettle mill and up-to-date gypsum wall board plant at Montreal, Que.

The mill will supply plaster for wall board only. The company will use an edge similar to that of the U. S. Gypsum Co. and Bestwall. The filler will be similar to the "Gypsolite" as used by the Universal Gypsum Co. of Chicago, Ill. Nova Scotia gypsum will be used.

Beg Your Pardon!

THE two gentlemen whose portraits appear below have been subjected to much "kidding" by their friends who read ROCK PRODUCTS, because, in a report of the Atlanta convention of the National Sand and Gravel Association, published in the January 23, 1926, issue, p. 68, a portrait of E. J. Krause appeared over the caption "R. C. Fletcher, elected vice-president."

R. C. Fletcher, vice-president, National Sand and Gravel Association

Mr. Krause, being a past-president of the National Crushed Stone Association and very active in its present councils, his portrait of course was quickly recognized by a host of readers; and because of the friendly rivalry between the two industries the error was amusing to most of them.

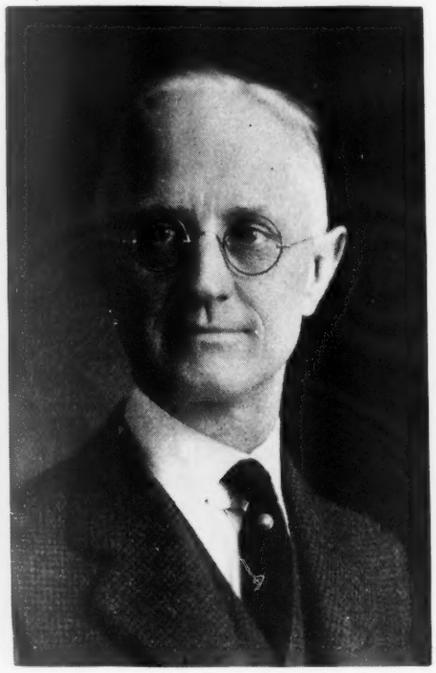
Mr. Fletcher and Mr. Krause have at least one bond in common, for both are bituminous coal operators, Mr. Krause in southern Illinois and Mr. Fletcher in Iowa. Mr. Fletcher, incidentally, is also a quarry operator.

We sincerely regret the error and the unusual opportunity it provided for the witticisms and raillery on the part of our friends, but we are glad that the victims have accepted the situation with the utmost good nature; and no harm has apparently been done to the good reputation of either.

National Agstone Association Meeting

AN aftermath of the recent Montreal convention of the National Crushed Stone Association was the annual meeting and election of the National Agstone (agricultural limestone) Association. J. C. King, retiring president, presided, and Leo Poorman, of the Frame Stone Co., Toledo, Ohio, was elected president.

Mr. Poorman outlined the history of the association for the past 20 years. He said that while the agricultural limestone business was still in its infancy, the National Agstone Association was two years ahead of the National Crushed Stone Association in research, for the Agstone Association has maintained a research fellowship at Ohio



E. J. Krause, past-president, National Crushed Stone Association

State University for more than two years.

Mr. King said the association was an economical one, that every penny expended was put to the utmost use. Both Messrs. King and Poorman referred to the remarkable increase in the use of agricultural limestone in Illinois in 1925, as evdience of the possibilities of developing increased tonnage.

A part of the research work now being done at Ohio State University is to determine the relative effectiveness and economy of different sizes, or fineness, of agricultural limestone, for the practice of Illinois farmers of using coarse material (screenings) at low prices is having a widespread effect on the industry.

Prof. Firman E. Baer, of Ohio State University, emphasized the necessity of more sales promotional work on the part of producers. He said we were now in the midst of a revolutionary period in agriculture and that the consumer must be made to pay the cost of salesmanship.

Edgar M. Lamkin, of the Kelley Island Lime and Transport Co., Cleveland, Ohio, told how he had increased the sales of his company during the past five years. He had found the best method was to sell by direct solicitation of the farmer; however, this was expensive, and the economical solution was for the salesman to sell other commodities also. He had four salesmen covering 88 counties in Ohio; 60% of his sales were in the fall of the year; 40% in the spring. In order to carry the salesmen the year round it was necessary to switch them on something else during the summer and winter.

New Officers

The following officers were elected: President, Leo Poorman, France Stone Co., Toledo; vice-president, Frank Colgan, Colgan Limestone Products Co., Columbus; secretary, W. H. Margraf, Marble Cliff Quarries Co., Columbus. Directors: Harry H. Brandon, Edgar M. Lamkin, E. J. Krause, W. H. Wallace, E. C. Walker, H. J. Filer, Ellwood Gilbert, P. B. Reinhold.

Leo Poorman, president, National Agricultural Limestone Association

Carl L. Van Voorhis, engineer, Ohio Crushed Stone Association, which is the new name of the Ohio Macadam Association. Mr. Voorhis is a former county highway engineer

Australia's Newest Portland Cement Plant

Standard Portland Cement Co., Ltd., Plant at Sidney, New South Wales, Australia

THE use of portland cement in Australia is increasing rapidly and the local production is by no means able to keep up with the demand. During the past year there has been an actual shortage of cement, and it was from a knowledge of such a condition and from full confidence in the industry that the Standard Portland Cement Co. of Sidney, N. S. W., was formed. When this plant is completed the Australian production will total about 6,600,000 bbl., which is approximately 1 bbl. per person. When it is considered that the United States uses about 1.6 bbl. per person, the opportunity for a larger Australian production is readily apparent.

Conditions for the manufacture of portland cement are especially favorable in the district north of Sydney, in which the new plant is being built. Limestone, shale and coal are all found on the company's ground and near the plant site. The same condition exists at the works of the Kandos Cement Co., a description of which was published in ROCK PRODUCTS, issue of February 9, 1924. The Standard plant is near the Kandos plant on the other side of a mountain. The Commonwealth Portland Cement Co. also operates in this section.

The Standard company was first organized as the Kandos-Coomber Mining Co. for developing the coal on its grounds. This was in 1920 and the company has since built up a large coal business supplying the Australian government railways and many private consumers, including two cement companies. Hence there is no doubt concerning the adaptability of the fuel for cement burning. To supply the Standard plant a special tunnel has been opened and the transportation cost is negligible, as the plant is less than 200 yd. from the portal of the tunnel. The coal will be burned as powdered coal in the manner which has proven so successful in American plants and which is also the practice in Australian plants.

The deposit from which limestone is obtained is three miles from the works and an aerial tramway has been installed to connect the two. This has a capacity of 100 tons per hour, which is much more than is needed for the present output, but in this as in everything else provision has been made for the expansion of the industry. The deposit as opened has a face 220 ft. high and the stone is of excellent quality for cement making, the magnesia content being very low.

Shale is mined close to the works. The crusher is placed in the shale pit and a belt conveyor takes it from the crusher to the shale bins above the dryer. The shale underlies the coal but not at the place where the shale is dug.

The plant is almost unique in that it is a hillside plant, utilizing gravity to carry the material through to the kilns. From the bottom of the limestone storage to the rails at the storage house, where the finished cement is loaded into cars, there is a difference of approximately 138 ft. in level. Taking advantage of this has resulted in less elevating and conveying machinery than would otherwise have been needed.

The tower of the aerial tramway at which the limestone is discharged is about 30 ft. above the ground and on a sloping hillside. This allows for a large tonnage of limestone to be stored and all of it will run to the plant by gravity. Below the limestone storage is a retaining wall and below this is a belt conveyor which takes the stone to the plant. Chutes with gates through the wall admit the stone to the conveyor.

The conveyor discharges to a rotary screen 12 ft. long and 60 in. in diameter. The oversize of this screen goes to a jaw crusher, the undersize goes to a pan conveyor, along with the discharge of the crusher, and is lifted to the limestone bins above the dryers which are necessary, as the plant uses the dry process. The shale is elevated to the shale bins by the same conveyor that brings it in from the shale pit. Rotating feeders feed either limestone or shale to the two rotary dryers, both of which are 60 ft. long and 6 ft. in diameter.

The dried limestone and shale go to separate bins, the shale bin being placed inside the limestone bin. Feeders from these bins discharge to the two raw grind mills which are three-compartment mills using a different size of steel balls in each compartment. The body of the mill is 36 ft. long and of 6 ft. diameter. The drive is by a 500 hp. synchronous motor made by the Pebles company of Edinburg, Scotland.

From the mills the ground product go to what is called the "raw meal storage," which contains nine bins 12 ft. square and 16 ft. high with hopper bottoms. It is lifted to the top of the storage by an elevator with 45 ft. centers and distributed to the bins by a longitudinal conveyor and six cross conveyors.

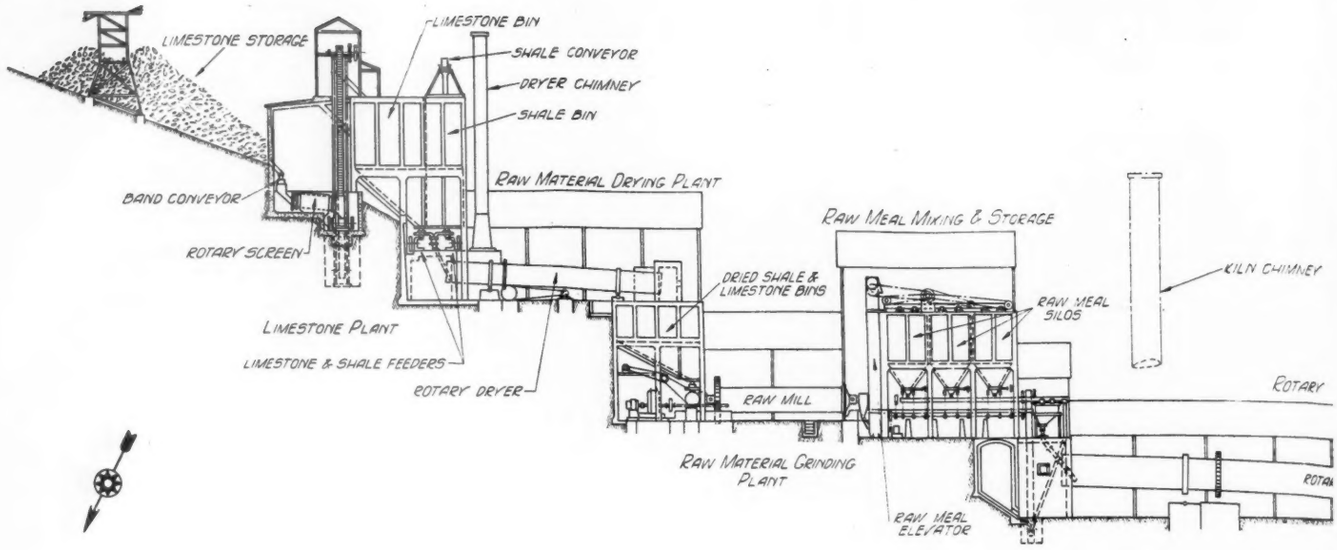
These bins have three cross conveyors which pass under the nine gates at the bottom of the bins and it is here that the correction of the mix is made, the gates being set to draw from " high" or "low" bins, according as the lime content needs to be increased or decreased. These conveyors discharge to a small hopper above the kilns and feeders from this hopper feed through chutes to the kilns.

The kilns are 148 ft. long and 9 ft. in diameter all the way. They are fired by pulverized coal and the system of storing and handling coal from the mine to the kiln has been worked out in a very interesting way.

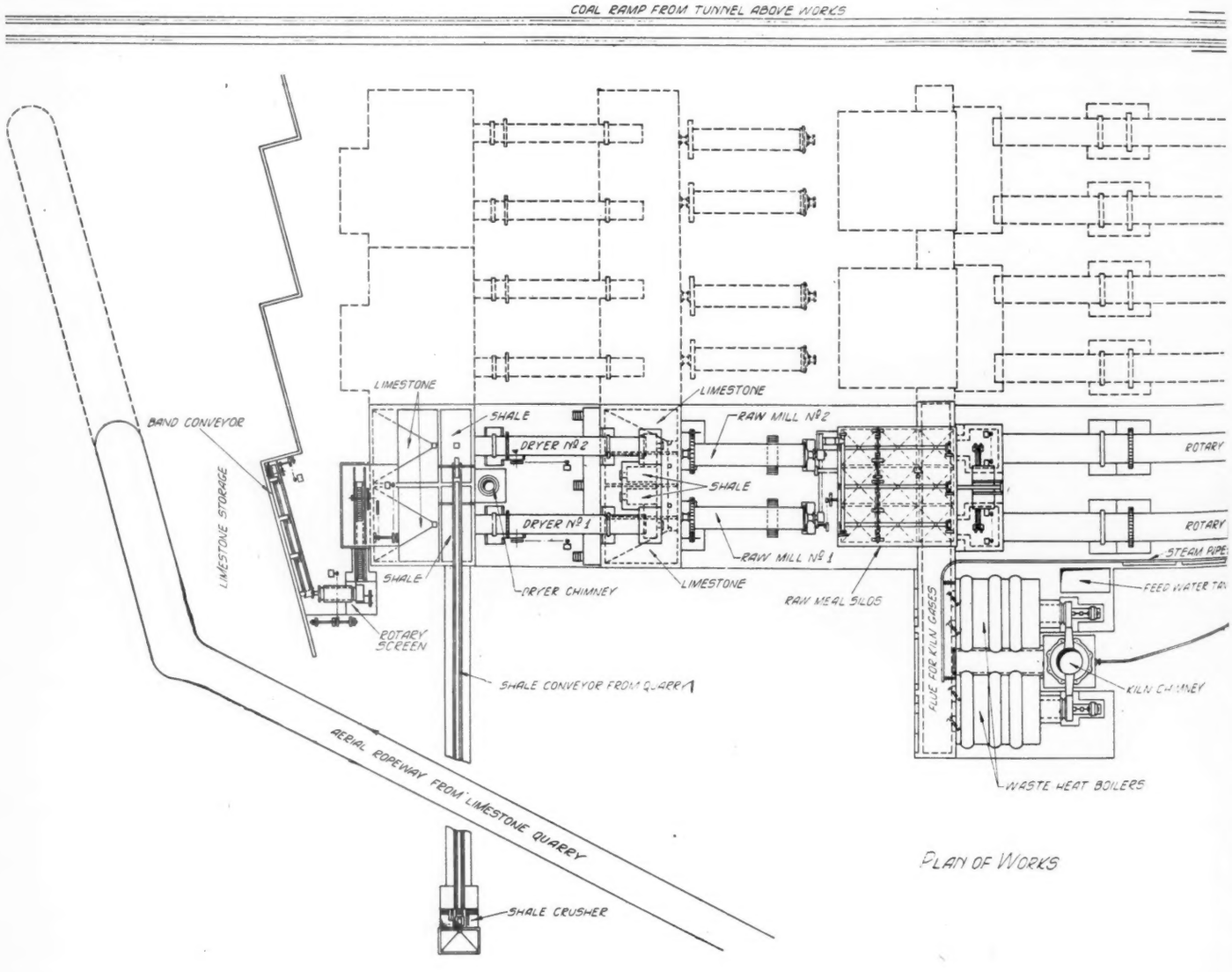
Coal is brought in from the mine by a rope haulage system and the cars make a circuit on a trestle and dump into the coal storage shed which is 80 ft. long and 45 ft. wide. Then they return to the mine over a parallel track. From the storage shed the coal goes by a belt conveyor to an elevator which lifts it to a steel bin with a hopper bottom. From this it flows to a turbo-pulverizer and thence directly to the pipes through which it is blown into the kilns. There is no drying of the coal and no storage of pulverized coal.

From the kilns the clinker falls to two rotary coolers which are 60 ft. long and 6 ft. in diameter. These are placed directly under the firing floor on which are the coal pulverizer and the pipes and blowers for firing the kilns. From the cooler the clinker falls into a Marcus push conveyor about 70 ft. long, which carries it to the clinker storage. This conveyor runs crosswise to the center line of the plant. A strictly straight-line design was not possible on account of the position of the railroad and the contour of the hill, so at this point an offset of 50 ft. was made.

The clinker storage is approximately 100x50 ft. The recovery is by means of a Marcus push conveyor 100 ft. long which extends in a gallery through the center of the storage pile with feeder openings at convenient points. From the conveyor discharge the clinker is raised by two elevators of 45 ft. centers. These discharge into steel bins above the finish grinding mills. The gypsum which is ground with the clinker is brought in by an elevator with 65 ft. centers which is inclined at about 45 deg. The boot of this elevator is below the level of the plant track on which the cars containing the gypsum are brought in. The gypsum storage into

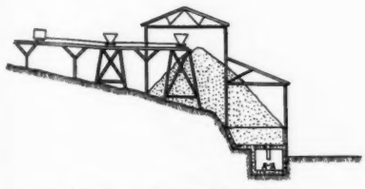


SIDE ELEVATION OF WORKS

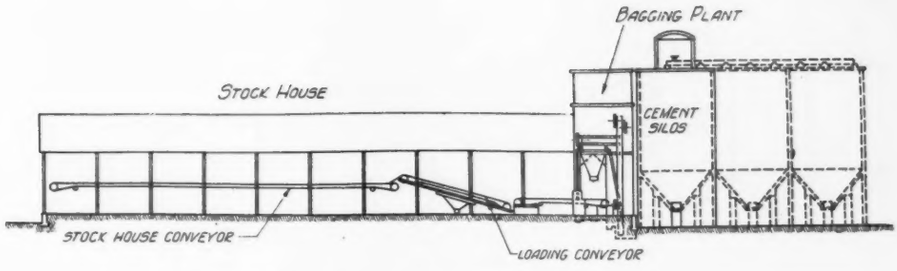


PLAN OF WORKS

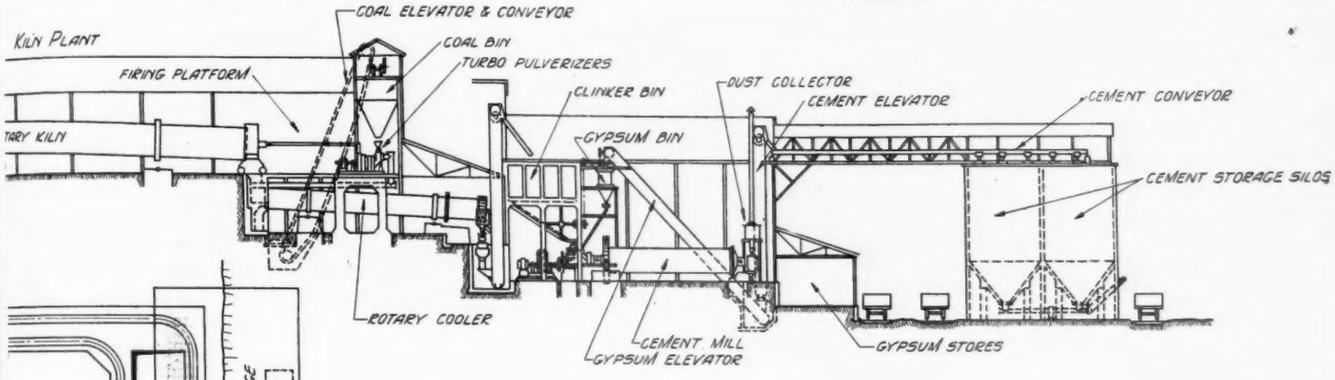
Side elevation and plan of new 2000-bbl. per day cement plant being built



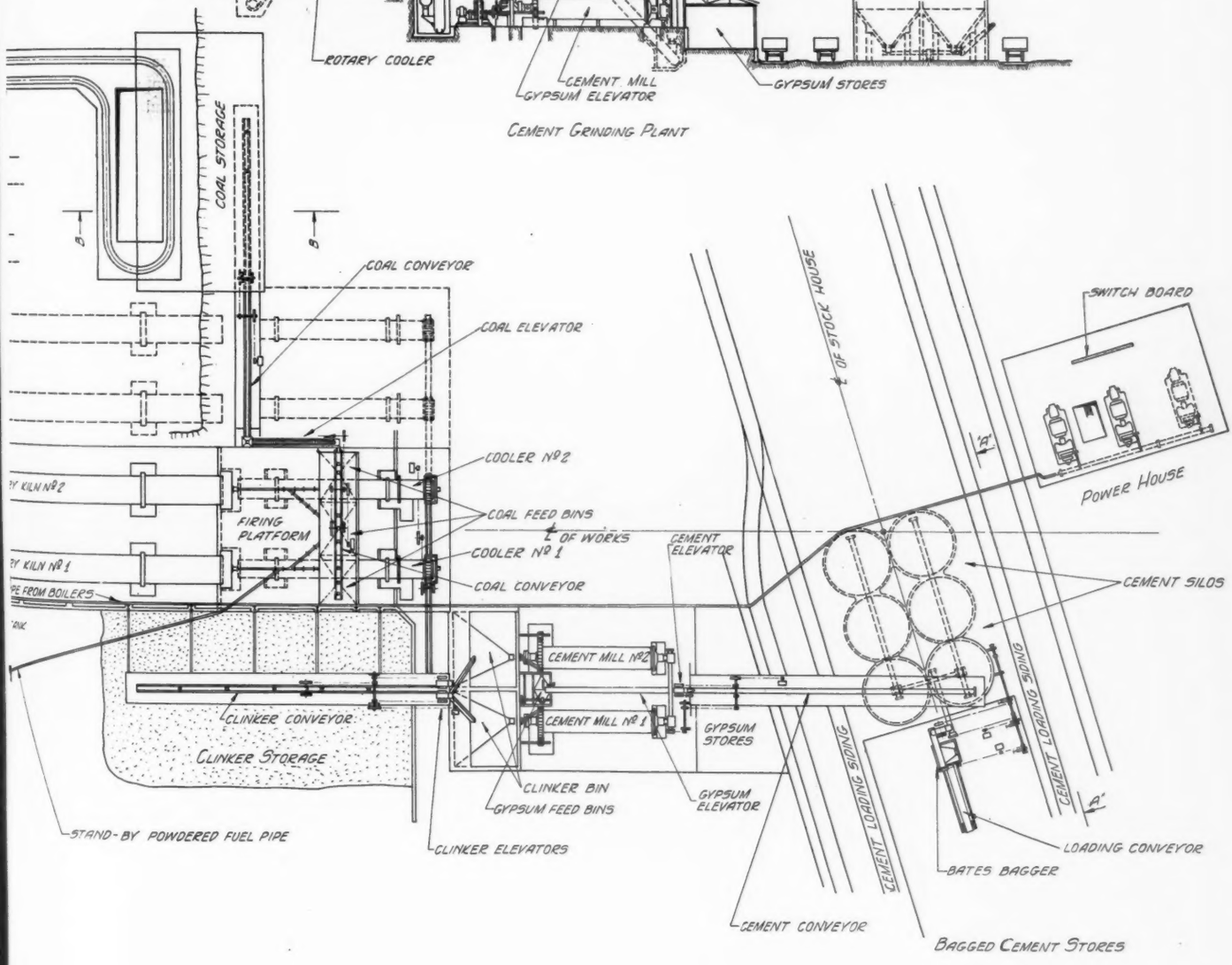
Coal Storage - Section "B-B"



Cement Stores in Direction "A-A"



Cement Grinding Plant



by the Standard Portland Cement Co., Ltd., at Sidney, N. S. W., Australia

which cars are unloaded is on this level between the track and the elevator.

The two finish grind mills are precisely like the raw grind mills previously described and are driven in the same way. The cement is discharged from them to a double screw conveyor by which it is brought to the boot of an elevator with 45 ft. centers which raises it to a push conveyor 90 ft. long. This conveyor is in a covered gallery which passes over two railroad tracks. It discharges into cross conveyors which distribute it to the silos. These are 20 ft. in diameter and 50 ft. high. There are only two built at present, but others are to be added as the business expands. Screw conveyors take the cement from the silos to a Bates valve bag packing machine and a conveyor takes the sacks from the packer to the cement storage house.

Power will be furnished by waste heat boilers of the water tube type made by James Allen, Wolverhampton, England. These are placed in a building at one side of the kiln house near the feed end of the kilns. The hot gases from the kilns pass into a flue which is 90 ft. long, 8 ft. wide and about 16 ft. deep with an arched roof and sloping bottom for cleaning out. Four gates from this flue allow the hot gases to pass under the boilers and between the water tubes and they are drawn through by two large fans which discharge into the kiln chimney. A pipe conveys pulverized coal from the turbo-pulverizers for use whenever there is insufficient heat from the kilns to furnish the requisite power.

On account of the contour of the ground and the position of the track it was necessary to place the power plant at a considerable distance from the boilers on the other side of the railroad track. Power plant and boilers are thus connected by a steam pipe about 450 ft. in length, but this has been placed underground and very well insulated so that heat losses will be brought to a minimum. The steam passes to two turbo-generators made by the British Thompson-Houston Co. which make all the current required for the operation. Except for the large motors driving the mills, the motors are all of Australian make. The switches, transformers and like apparatus were all furnished by the General Electric Co.

Aside from the machines the makers of which have been mentioned, all the machinery of the plant was furnished by the Edgar Allen Co. of Sheffield, England. The design of the plant was by J. Oakden, consulting engineer, of Sidney, and his assistant, W. E. Longworth.

A. J. Swan, the president of the company is identified with a number of rock products enterprises in Australia. He made a long study of the cement industry in the United States and in Europe, visiting the principal plants on both sides of the Atlantic before beginning to build the works described here. He has full confidence that the plant as described will shortly be enlarged to meet an increased demand, and as the drawings accompanying this story show full provision has been made for enlargement. The plant as built will produce 2000 bbl. daily from its two kilns. In its final shape it will produce 12,000 bbl. daily from 6 kilns, when all the plans which have been made for its expansion have been carried out.

New British Ciment Fondu Plant in Operation

THE new works of the Lafarge Aluminous Cement Co., Ltd., at West Thurrock, Essex, are now completed, and are in operation. They are designed for an output of 150,000 tons per year, and plant, for an output of 40,000 tons, is now in operation.

Situated on the banks of the Thames, they are well placed for the rapid despatch of the output by road, rail or water. They are nearer to London than any other cement works, and are the only works of their kind in the world. To date £130,000 (about $650,000) has been expended on them. They stand on a site of about seven acres.

The constructional work was carried out by the Foundation Co., Ltd., under the supervision of R. R. Woodcock, chief engineer to the Lafarge Aluminous Cement Co., Ltd. The steel structures were by Heenan and Froudie, Ltd., and Nissens, Ltd.; the crushing and screening plant by Ernest Newall, Ltd.; briquetting plant by Messrs. Johnson and Sons; lime kilns by Priests Furnaces, Ltd., and grinding plant by Vickers, Ltd. The special furnaces for treating the lime, bauxite, etc., were built by Priests Furnaces, Ltd.

All the extensive plant and machinery had to be specially designed as the process employed differs widely from that used for portland cement. The whole of the plant was supplied by British firms, the workmen are all British, and, wherever possible, disabled ex-service men are employed.

The works are electrically driven throughout by current obtained from the Barking station of the County of London Electric Supply Co., Ltd.

A block of land has been purchased in the vicinity of the works, and a garden village has been designed for the accommodation of the more essential workmen.

An important section of the works is a laboratory where the quality of the cement is under continual control. Tests and experiments are also freely carried out on behalf of customers.

At a luncheon held in connection with the opening of the works, the chairman of the company, J. G. Kay, said: "Although new enterprises are launched every day, the birth of an entirely new British industry manufacturing a product which can truly be called revolutionary is one of those very rare occurrences which cannot be allowed to pass unnoticed.

"A word about the genesis of Ciment Fondu will not be out of place. As its name indicates, it was of French origin. Its rapid hardening was not the primary object of research, but a purely incidental phenomenon which disclosed itself during extended experiments to discover a cement to resist the destructive effects of sea-water and other sulphur-impregnated water which cause all cements to decompose. The main object of the experiments was eminently successful. Ciment Fondu is the only cement in the world which is known to be entirely proof again decomposition by sea-water. The fact that all cement structures in sea-water are, sooner or later, doomed to destruction is causing harbor engineers such concern at the present moment than an official committee has been appointed to discover some means to protect existing structures. As prevention is better than cure, it is reasonable to suppose that any new concrete work in sea-water will be made permanent at the outset by the use of Ciment Fondu.

"From January 1 this year, Ciment Fondu became a British product. The works are equipped with the most modern machinery, and on them we have expended £130,000. The whole of that sum has been spent in British plants, notwithstanding the fact that machinery of considerably lower price could have been imported from abroad. Our insistence on British machinery was not only patriotic but has already proved to have been commercially wise as we have been rewarded by a far higher degree of efficiency than we anticipated even in our most sanguine moments."—*Contract Journal (London, England).*

Bureau of Soils' Work on Phosphate

IN our review of the phosphate industry published in the December 26 issue, we credited the U. S. Bureau of Mines as the agency that has carried out the research on preparation of phosphorus and phosphoric acid by volatilization of phosphates. K. D. Jacob, associate chemist in charge of phosphate investigations, Bureau of Soils, Washington, D. C., has written us to the effect that the Bureau of Soils is the government agency which should be credited with this experimental work.

Mr. Jacob adds: "We have been carrying out research on the various processes for the production of phosphorus and phosphoric acid by volatilization from phosphate rock for the past 12 years, and during this time we have developed two types of processes which are now in commercial use. The electric furnace process was first developed and is now in large scale operation by the Federal Phosphorus Co., Anniston, Ala. This work was followed by the development of a fuel-fired furnace for the manufacture of phosphoric acid and this process is now being operated by the Victor Chemical Co., Chicago Heights, Ill."

Warner-American Employes Insured*

Amounts Range from $500 to $1500

THE executives of the Charles Warner and American Lime and Stone companies have approved of instituting a policy of insuring the lives of all employes of both companies who have been employed longer than six months. This plan became effective January 1, and after that date, upon the death of any employe, his family or other dependents will receive a sum ranging from $500 to $1500 according to the length of time the worker has been in the employ of either company.

The full amount of the insurance will be also paid to any employe who becomes totally disabled before the age of 65. This insurance has been placed with the Travelers Insurance Co. of Hartford, Conn. The essential details of the plan are as follows:

Eligibility

1. Each employe will be eligible for insurance coverage when he has been in the continuous employ of the company for a period of six months.

Physical Examination

No physical examination is required.

Continuity of Service

2. Continuity and length of service of participants under this plan will be established in accordance with the company's rules defining "continuity of service." Protection will continue on employes during temporary lay-off, leave of absence or temporary physical disability. Employes otherwise eligible, but who are not actually working on the effective date of the policy will be covered upon their return to work.

Amount of Insurance

3. Subject to the terms of this plan, the amount of insurance on the life of each employe, commencing at $500 upon completion of six months' continuous service, will be increased upon the completion of each successive year of continuous service until a maximum of $1500 has been reached. (See accompanying table.)

Beneficiaries

4. Insured employes may designate beneficiaries to receive the insurance in the event of their death. An insured employe may change his beneficiary at any time upon execution of the proper form, which will be supplied upon request. No change of beneficiary shall be effective until entered upon the books of the Travelers Insurance Co., Hartford, Conn.

Assignment of Insurance

5. No assignment of the insurance herein referred to shall be valid.

Method of Payment

6. Upon the death of an employe while in the active service of the company the amount of insurance to which he is entitled will, upon due proof of death, be paid to his duly designated beneficiary one-third in cash and the balance in 12 equal monthly installments.

Total Permanent Disability Benefits

7. If an employe, while insured and before reaching his sixtieth birthday becomes totally disabled by bodily injuries or disease, and will be permanently and wholly prevented thereby for life from pursuing any and all gainful occupation, the amount of this insurance will be paid to him in a fixed number of installments, such number to be chosen by the Charles Warner Co., or the American Lime and Stone Co., as the case may be.

Cost to Employe

8. This insurance is issued without any expense whatever to employes, the entire cost being borne by the Charles Warner Co. and the American Lime and Stone Co. and is in addition to any compensation to which they might be entitled under any state compensation act.

Termination of Insurance

9. If employe's insurance is cancelled by termination of employment, a period of 31 days is allowed during which he may apply in writing to the Travelers Insurance Co. for a regular life insurance policy in the amount of his insurance under the group policy. An employe who avails himself of this privilege can then *without medical examination*, obtain any form of life policy regularly issued to an individual of his age and occupation—excepting term insurance.

A Certificate for Every Employe

10. As tangible evidence, each employe receives a certificate stating his name and the name of his beneficiary, his initial amount of insurance, and general plan. Each certificate contains the conversion and permanent total disability clauses as given in the policy.

Modification or Termination of the Plan

11. The Charles Warner Co. and the American Lime and Stone Co. reserve full right at any time to modify or terminate this plan, and to discontinue this insurance, by order of the board of directors of either company.

Insurance Plan in Brief

1. *All employes insured after six months' service.*
2. *Amount of insurance ranges from $500 to $1500.*
3. *Insurance money paid to persons named by employe.*
4. *Insurance money paid one-third in cash at time of death and balance in 12 monthly installments.*
5. *Money will be paid before death if employe is totally disabled.*
6. *Absence through sickness, accident, or temporary lay-off does not cancel insurance.*
7. *No physical examination required.*
8. *Entire cost paid by company.*

Each Employee who has been employed for		Will be Insured for
6 months and less than	18 months	$500.00
1½ years and less than	2½ years	600.00
2½ years and less than	3½ years	700.00
3½ years and less than	4½ years	800.00
4½ years and less than	5½ years	900.00
5½ years and less than	6½ years	1000.00
6½ years and less than	7½ years	1100.00
7½ years and less than	8½ years	1200 00
8½ years and less than	9½ years	1300.00
9½ years and less than	10½ years	1400.00
10½ years and over		1500.00

Table giving the insurance according to years of service with the company

*From the *Warner-American News.*

Hints and Helps for Superintendents

Compressed Air Drives Marl Two Miles

By GEORGE F. PAUL
Chicago, Ill.

AN INGENIOUS METHOD has been devised to transport marl for a distance of two miles from the source of supply to the plant of the Peninsular Portland Cement Co. at Cement City, Mich. A pipe line operated by compressed air is being used for this purpose.

The location of the plant was originally chosen with the idea of utilizing the marl to furnish the calcium carbonate constituent in the raw mix. After several years of operation, the marl supply in the immediate vicinity was used up. Then an arrangement was made to bring screenings and quarry waste from Lewisburg, Ohio, but with increasing freight rates this proved an unsatisfactory plan, so the company decided to return to the use of marl if possible. The nearest lake having any considerable supply of marl suitable for use in the manufacture of cement was Silver Lake, located two miles from the plant. Careful consideration was given to several plans for transporting the marl to the plant site.

Pumping systems were considered, but the pump manufacturers refused to guarantee results because of the distance, differences of elevation, and physical properties of the ground. The plan of using an industrial railway was discarded as calling for too elaborate an equipment and too large an investment. It was finally decided to install a pipe line and bring the marl over with compressed air.

The length of the line and the volume of material to be handled made this a new project in this field and there were many doubts expressed as to the feasibility of the plan. Previous experience in transporting slurry by means of compressed air swung the decision in favor of the pipe line, the only auxiliary safeguard being a booster tank. This was installed at the first relay station for the purpose of supplying additional air pressure into the pipe line after the material had left the receiver tanks. The service of this booster has never been found necessary as from the beginning of operations it was possible to pump the material the distance between the first and second relay stations without the slightest difficulty.

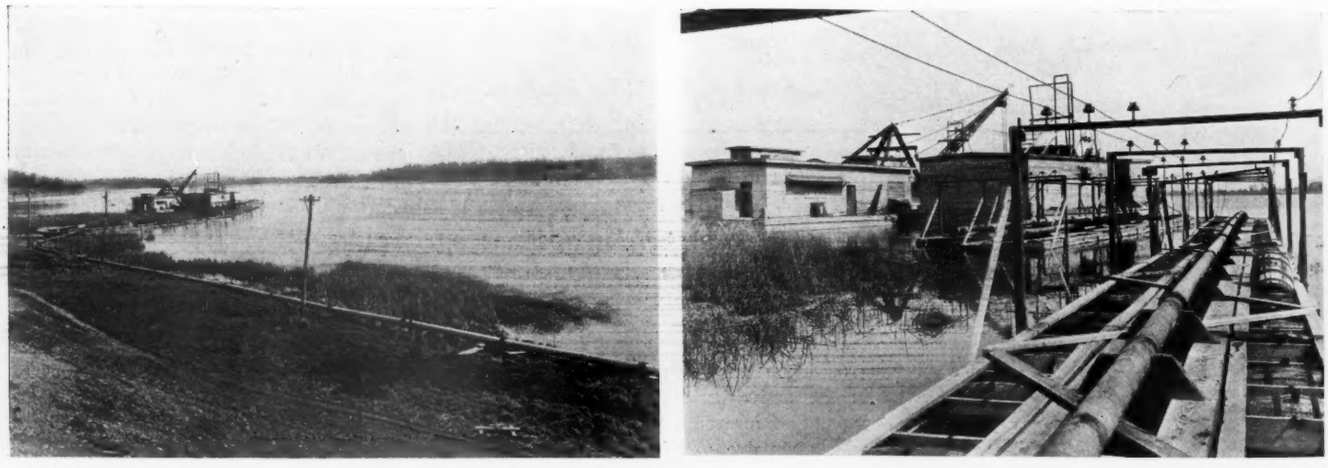
Accordingly, work was started on a new dredge and scow. Boat builders from Port Huron, Mich., erected these. The dredge consists of a hull 32x76 ft., 6 ft. in depth, built up of 8x12 Y.P. timbers, with bulkheads built under engine boiler and boom. The bottom was caulked with cotton and oakum and given a coat of creosote paint; the rest of the hull was covered with red lead. The equipment in the hull consists of a 40-hp. Lidgerwood boiler and a two-drum engine, a boom that revolves in a half circle, and a Hayward orange-peel bucket that is operated on a double-strand chain 1x5-in. links.

The scow consists of a hull 36x65 ft., 5 ft. in depth. The equipment, all electrically driven, consists of a separator which greatly resembles, in looks and operation, an exaggerated sausage mill. This separator receives the bucket load of marl from the orange peel, which dumps into the hopper directly overhead. A 2-in. stream of water, supplied by a triplex plunger pump, is added and the revolving paddles and screw of the separator force the marl through a screen at the end of the separator. This screen retains the roots, pebbles, or other foreign matter contained in the marl, which might clog the pumping system. From the separator the marl drops into a small storage vat and is there kept in constant agitation by mechanical means.

The return air system is furnished by the Ingersoll-Rand Co. The unit in the scow consists of an air compressor 11x14-in., driven by a 75-hp. motor, connected to a 36x5-in. compensating receiver.

Two circular steel tanks, 5 ft. in diameter and 5 ft. high, are located next to the storage vat with inlet of tank at the level of outlet of vat. They are connected with the receiver and compressor through an automatic switch. This operates in such a manner that air is drawn from one steel tank, forming a vacuum and causing the slurry to rush into this tank, filling it while the other tank is placed under pressure, causing its contents to be discharged. The switch can be set at any operating pressure desired, and when this pressure is reached the switch automatically trips, causing the operation to reverse so that the tanks are alternately filled and emptied. A standpipe carrying a float valve of height varying according to conditions, but ordinarily about 20 ft. high, prevents the slurry from going over into the compressors when the tank becomes filled.

As the distance of approximately 10,000 ft. from the lake to the mill is a greater distance than had ever been tried out before, it was decided to install two relay stations and divide the duty required of any one unit. Accordingly the first relay was established at a point about 1700 ft. from the lake, in order to give the pumping machinery on the scow the lightest duty at the



Left—Lake from which the marl is obtained, dredging outfit and compressed air pipe line for transporting the marl to the plant. Right—Compressed air pipe line approaching dredge

Left—Compressed air pipe line for transporting marl running along railroad right-of-way to plant. Right—Relay House No. 2, located about 4000 ft. from the plant

start and a chance to add additional length of line as the marl became exhausted.

Each relay system consists of a receiving vat of concrete, 18x20x7 ft. deep, a compressor, and pumping system similar to that on the dredge. The distance between the first and second relays is 4400 ft., and from the second relay to the plant is under 4000 ft.

No difficulty is experienced in transporting the marl slurry the greatest distance of 4400 ft., a difference in elevation of 30 ft. with an air pressure varying from 75 to 90 lb. A 12-in. pipe, spiral riveted, is used in this line. The problems of expansion in the line and the difficulties in making a tight joint encountered in laying the pipe over unequal surfaces was overcome by the use of Root flexible joints. This joint slips over the smooth end of a pipe and permits a variation of 7½ deg. in a single joint. This is a great help where curves are required. At each end is a rubber gasket, which effectually seals the joint. After a thorough test no leaks have occurred.

It was found that it was necessary to operate the dredge and pumping system for only two shifts of 8 hr. each, and that marl slurry containing about 50% of moisture could be pumped over effectively.

Two marl storage vats 80x50x14 ft. were built at the plant with the idea that by pumping one vat full and allowing it to settle, considerable water could be drawn off from the top. Drains were provided in the walls of the storage vats for this purpose.

The adaptation of this plant to the use of either marl or limestone gives it a flexibility that few other installations possess. The system was installed by the Cowham Engineering Co., Chicago.

Five Tons of Rock Per Pound of Explosives

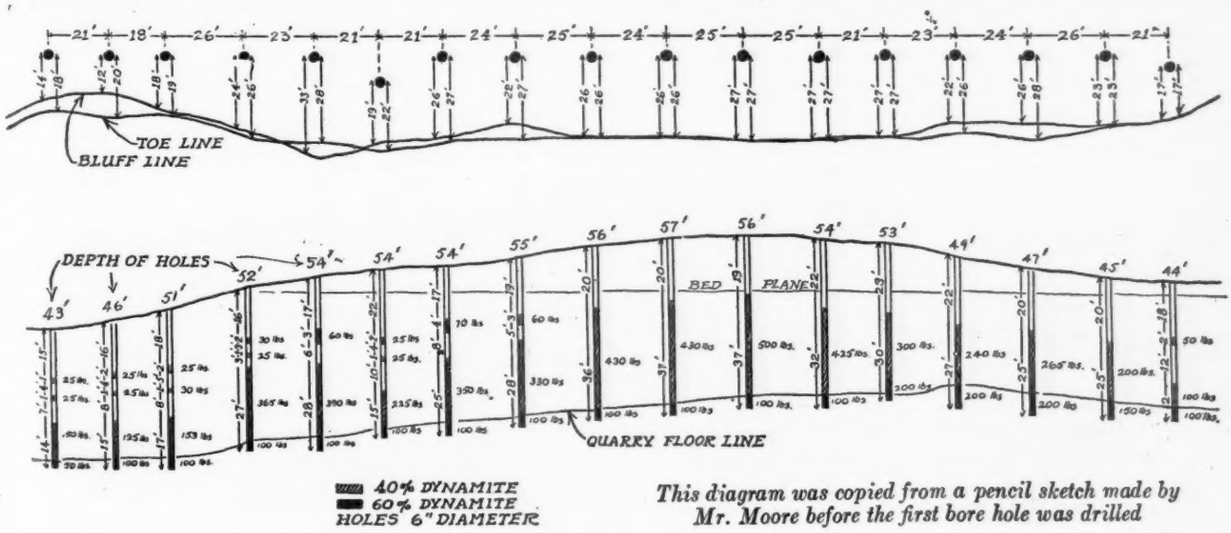
"Plan your work, and then work your plan."

THAT'S good counsel, and almost everyone accepts it in principle. But how many people follow the precept? Certainly not so many as might do so with profit, and that's why this story is worth telling.

Out in Missouri the S. J. White Stone Co., a subsidiary of the Kansas City Bridge Co., operates a limestone quarry at Blackwater, where large quantities of rock are produced for road building, bridge construction and levee work in and around Missouri. The superintendent in charge of this quarry is J. A. Moore, a graduate of the University of Kansas, and a captain of the U. S. Engineers during the late war.

Anyone so trained would be expected to follow a planned work program—and Mr. Moore does. Before any quarry blasting is undertaken he makes a layout of each shot, indicating all the data you will find on the chart reproduced below. Thus he has the entire plan of the shot for record, and if it doesn't break well at some place, when fired, he can look for the cause.

Does planned work pay? Well, take the record of the shot just mentioned. The blast was set off early in 1924. The total charge was 5458 lb. of 40% Red Cross Extra and 2000 lb. of 60% strength. The shot brought down 38,000 tons of rock—5.1 tons per pound of explosives used. The fragmentation was excellent, and the total cost, including stripping, drilling, labor of loading and explosives, was 8.9 cents a ton. Does planned work pay? It does.—*The du Pont Magazine.*



This diagram was copied from a pencil sketch made by Mr. Moore before the first bore hole was drilled

By placing the charge according to this plan the S. J. White Stone Co. obtained over 5 tons of rock per pound of explosives used

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

(These are the most recent quotations available at this printing. Revisions, corrections and supplemental information will be welcomed by the editor.)

Stock	Date	Par	Price bid	Price asked	Dividend rate
Alpha Portland Cement Co. (common)**	Feb. 17	100	135	138	1¼% quar. 25% ex. Dec. 1
Alpha Portland Cement Co. (preferred)**	Feb. 17	100	114	.....	1½% quar. Sept. 1
Arundel Corporation (sand and gravel—new stock)	Feb. 17	No par	34	34⅛	30c quar., 60c ex, Jan. 2
Atlas Portland Cement Co. (common)	Feb. 17	No par	50½	50½	50c quar.
Atlas Portland Cement Co. (preferred)	.....	100	.....	.....	2% quar. Oct. 1
Atlas Portland Cement Co. (preferred)**	Feb. 13	33⅓	44	48	2% quar. Oct. 1
Bessemer Limestone and Cement Co. (common)‡	Feb. 13	100	145	150	1½% quar. Jan. 1, 4% ex. Jan. 1
Bessemer Limestone and Cement Co. (preferred)‡	Feb. 13	100	107	110	1¾% quar. Jan. 1
Bessemer Limestone and Cement Co. (convertible 8% notes)‡	Feb. 13	.....	120	135	8% annual
Boston Sand and Gravel Co. (common) (r)	Feb. 12	100	61	.....	2% quar. July 1
Boston Sand and Gravel Co. (preferred) (d)	Jan. 15	.....	.....	80	1¾% quar. Oct. 1
Boston Sand and Gravel Co. (1st preferred) (d)	Jan. 15	.....	.....	90	2% quar. Oct. 1
Canada Cement Co., Ltd. (common)	Feb. 17	100	107½	108	1½% quar. Jan. 16
Canada Cement Co., Ltd. (preferred) (f)	Feb. 12	100	118	119	1¾% quar. Feb. 16
Canada Cement Co., Ltd. (1st 6's, 1929) (f)	Feb. 12	.....	102¾	103¾	3% semi-annual A&O
Canada Crushed Stone Corp., Ltd. (6½s, 1944) (f)	Feb. 12	100	93	96	
Charles Warner Co. (lime, crushed stone, sand and gravel)	Feb. 12	No par	22	24½	50c quar. Jan. 11
Charles Warner Co. (preferred)	Feb. 12	100	101	103	1¾% quar. Jan. 28
Charles Warner Co. (lime, crushed stone, sand and gravel) 7s, 1929 (r)	Feb. 12	100	105	.....	
Cleveland Stone Co.	Feb. 15	.....	151	152	1½% quar., Mar. 1, 1% ex. Mar. 1
Connecticut Quarries Co. (1st Mortgage 7% bonds) (s)	Feb. 13	100	103½	.....	
Dolese and Shepard Co. (crushed stone) (a)	Feb. 17	50	77	80	$1.50 quar. Jan. 1
Giant Portland Cement Co. (common)**	Feb. 13	50	44	45	
Giant Portland Cement Co. (preferred)**	Feb. 13	50	45	48¼	3½%s.-a. Dec. 15, plus 10% arrears.
Ideal Cement Co. (common)‖	Feb. 17	No par	80	85	$1 quar. Jan. 2. 50c ex. Dec. 27
Ideal Cement Co. (preferred)‖	Feb. 11	100	107	109	1¾% quar. Jan. 2
International Cement Corporation (common)	Feb. 17	No par	67	67¾	$1 quar. Dec. 31
International Cement Corporation (preferred)**	Feb. 15	100	105¼	105½	1¾% quar. Dec. 31
International Portland Cement Co., Ltd. (preferred)	Mar. 1	.....	30	45	
Kelley Island Lime and Transport Co.	Feb. 15	100	123	125	$2 quar. $2 ex. Jan. 2
Lawrence Portland Cement Co.**	Feb. 3	100	110	.....	2% quar.
Lehigh Portland Cement Co.‖	Feb. 11	50	91	93	1½% quar.
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, expire serially up to 1930) (k)	Feb. 11	100	99	100	
Lyman Richey Sand and Gravel Co. (1st Mort. 6s, expire serially from 1930 to 1935) (k)	Feb. 11	100	97	100	
Michigan Limestone and Chemical Co. (common)‖	Feb. 11	.....	24½	.....	
Michigan Limestone and Chemical Co. (preferred)‖	Feb. 11	.....	24½	.....	1¾% quar. July 15
Missouri Portland Cement Co.	Feb. 17	25	61½	62	50c quar. Feb. 1
Monolith Portland Cement Co. (common) (c)	Feb. 11	.....	9½	10	
Monolith Portland Cement Co. (units) (c)	Feb. 11	.....	26	27½	
Monolith Portland Cement Co. (preferred) (c)	Feb. 11	.....	8¼	8¾	
Newaygo Portland Cement Co.*	Feb. 13	.....	125	.....	
New England Lime Co. (Series A, preferred) (i)	Jan. 29	100	96½	99	
New England Lime Co. (Series B, preferred) (i)	Jan. 29	100	96½	99	
New England Lime Co. (V.T.C.) (i)	Jan. 29	.....	23	25	
New England Lime Co. (6s, 1935) (m)	Feb. 12	100	99	100	
North American Cement Corp. 6½s 1940 (with warrants)	Feb. 17	.....	99	99	
North American Cement Corp. (units of 1 sh. pfd. plus ½ sh. common) (z)	Feb. 15	.....	94	99	2 mo. period at rate of 7%
North American Cement Corp. (preferred)	Dec. 31	.....	.....	.....	1.75 quar. Feb. 1
Pacific Portland Cement Co., Consolidated (§)	Feb. 13	100	97	97½	½% mo.
Pacific Portland Cement Co., Consolidated (secured serial gold notes)§	Feb. 13	.....	100¼	101	3% semi-annual Oct. 15
Peerless Portland Cement Co.*	Feb. 13	10	6⅛	7¼	
Petoskey Portland Cement Co.*	Feb. 13	10	10	.....	1½% quar.
Rockland and Rockport Lime Corp. (1st preferred) (d)	Feb. 17	100	98	99	3½% semi-annual Feb. 1
Rockland and Rockport Lime Corp. (2nd preferred) (d)	Jan. 15	100	.....	70	3% semi-annual Feb. 1
Rockland and Rockport Lime Corp. (common) (d)	Feb. 1	No par	.....	60	1½% quar. Nov. 2
Sandusky Cement Co. (common)*	Feb. 17	100	130	133	$2 quar. $3 ex. Dec. 31
Santa Cruz Portland Cement Co. (bonds) (§)	Feb. 13	.....	104	105	6% annual
Santa Cruz Portland Cement Co. (common) (§)	Feb. 13	50	85	.....	$1 quar. $1 ex. Dec. 24
Superior Portland Cement, Inc. (new stock) (6)	Jan. 19	.....	45	.....	
United States Gypsum Co. (common)	Feb. 17	20	148	148	2% quar. Mar. 31,
United States Gypsum Co. (preferred)	Feb. 17	100	115	117	1¾% quar. Mar. 31
Universal Gypsum Co. (common)†	Feb. 17	No par	21	22	
Universal Gypsum V. T. C.†	Feb. 17	No par	19	20	
Universal Gypsum Co. (preferred)†	Aug. 5	.....	76	.....	1¾% quar. Sept. 15
Universal Gypsum Co. (1st mortgage 7% bonds)†	Feb. 17	.....	99	(at 6½%)	
Union Rock Co. (7% serial gold bonds) (y)	Jan. 28	100	100	102	
Wabash Portland Cement Co.*	Aug. 3	50	60	100	
Wisconsin Lime and Cement Co. (1st Mort. 6s, 1940) (o)	Jan. 2	100	98⅜	100	
Wolverine Portland Cement Co.	Feb. 17	10	7¾	8	2% quar. Aug. 15

*Quotations by Watling, Lerchen & Co., Detroit, Mich. **Quotations by Bristol & Willett, New York. †Quotations by True, Webber & Co., Chicago. ‡Quotations by Butler, Beadling & Co., Youngstown, Ohio. §Quotation by Freeman, Smith & Camp Co., San Francisco, Calif. ‖Quotations by Frederic H. Hatch & Co., New York. (a) Quotations by F. M. Zeiler & Co., Chicago, Ill. (b) Quotations by De Fremery & Co., San Francisco, Calif. (c) Quotations by A. E. White Co., San Francisco, Calif. (d) Quotations by Lee, Higginson & Co., Boston, Mass. (f) Nesbitt, Thomson & Co., Montreal, Canada. (i) E. B. Merritt & Co., Inc., Bridgeport, Conn. (k) Peters Trust Co., Omaha, Neb. (m) Second Ward Securities Co., Milwaukee, Wis. (o) Central Trust Co. of Illinois, Chicago. (r) J. S. Wilson Jr. Co., Baltimore, Md. (s) Chas. W. Scranton & Co., New Haven, Conn. (y) Dean, Witter & Co., Los Angeles, Calif. (z) Hemphill, Noyes & Co., New York. (6) Quotations by Bond & Goodwin & Tucker, Inc., San Francisco.

QUOTATIONS ON INACTIVE ROCK PRODUCTS CORPORATION SECURITIES ON PAGE 68

Editorial Comment

Lessons in Old Plants

Most of the plant descriptions published in these pages from time to time are of new plants. The new plant is interesting because it is new—it has, in journalistic phraseology, *news interest*. Unfortunately, however, these new plants are not always the perfection in subsequent operation that their builders conceived, and it is seldom possible to develop these perfections without some years of operation. Our descriptions are therefore incomplete and of limited value on that account. Moreover, we look back with regret on certain plant descriptions which gave our readers the impression of smoothly running operations, when from subsequent knowledge we know the opposite to be true. There is therefore much to be learned from plants which have operated over a period of years, where the experience gained from their operation is available.

Contributed Articles Solicited

We are delighted to see each year an increasing number of literary contributions from the readers of Rock Products. Only a few short years ago it was almost impossible to get operating men to *write anything*. They have always been ready enough to discuss their work orally, when visited, but they have always been too modest, or too busy, or too lacking in self-confidence to write about it. We (editors) must of necessity have a limited knowledge of many operating problems, not having been operators, at least not for any great length of time. We imagine our ignorance in some instances has been all too apparent to our readers.

The real function of an editor is really to *edit* rather than write, anyhow. He is expected to have a broad general knowledge of his field and the judgment to know what is noteworthy, interesting and helpful. His training and his energies are largely devoted to perfecting himself for that end. The editor must therefore rely on his contributors for exact knowledge of many intricate details and problems in connection with the industries he serves; so he welcomes contributions from bona fide operating men, whether such contributions are written long-hand in pencil, or typewritten, grammatically composed or otherwise.

We believe there is a satisfaction in writing worthwhile articles and having them published that a writer can find in no other way. That satisfaction comes not merely in the exhibit of knowledge on the part of the writer, but from a sense of having rendered a public service, however limited its scope. We are glad to be able to promise our friends and readers more articles by actual operating men in the next few months, than we have had in almost as many years.

Help the Geological Survey!

A part of the economy program at Washington is to cut the budget of the Department of the Interior and the U. S. Geological Survey, which will prevent the Survey from continuing its topographical mapping of the United States. As men who make use of these topographic maps and appreciate their value to the mining industries we urge all of our readers to get in touch with their congressmen and senators and protest against the stopping of this necessary and valuable government activity. We urge *immediate* action; in other words do it now!

How to Make a Profit?

Until a very short time ago the majority of producers and manufacturers thought of a trade association only as a scheme to fix prices by fair means or foul. That is because every one knows that there are but two ways to make a profit, the one to raise the price, the other to cut the costs. Since nearly every man, from personal vanity or other motive, is apt to consider his costs as at an irreducible minimum, it is natural to jump to the conclusion that the profit is wholly in raising prices.

But, it is unlawful for producers and manufacturers to combine in a trade association or out of it to raise prices either directly, or indirectly by restraint of or curtailment of production. That is a fundamental principle of common law as well as the essence of the Sherman anti-trust law and all the various state anti-trust laws. It is not only unlawful and against sound public policy, but it is unmoral. It will always be so and none of us would have it otherwise, since while we are selfish enough to want to raise our own prices we are consumers of too many things to want to be put at the mercy of the producers or manufacturers of these things, under present conditions.

It is not unlawful, however, under the most recent decisions of the United States Supreme Court, for trade associations to influence prices through giving their members such a thorough knowledge of the state of their industry, and of their customers' industries, that the members of a trade association may make their own prices high enough to yield a fair and reasonable profit.

It would be idle to deny that well organized, efficiently operating trade associations have a real influence on the prices of the commodity they stand for. But that influence is legitimate, and from the point of view of public welfare desirable, when it is based upon a better, wider, keener knowledge of business, from whatever source such knowledge comes.

QUOTATIONS OF INACTIVE ROCK PRODUCTS SECURITIES

Stock	Date	Par	Price Bid	Price asked	Dividend rate
Coplay Cement Mfg. Co. (common) (4)	Dec. 16	.....	12½	.....	
Coplay Cement Mfg. Co. (preferred) (1)	Dec. 30	.....	70	.....	
Eastern Brick Corp. (7% cum. pfd.) (1)	Dec. 9	10	40c	.....	
Eastern Brick Corp. (sand lime brick) (common) (1)	Dec. 9	10	40c	.....	
Edison Portland Cement Co. (common)	Nov. 3	50	7½c(x)	.....	
Edison Portland Cement Co. (preferred)	Nov. 3	50	17½c(x)	.....	
Lime and Stone Products Co. (1100 sh. pfd., $10 par and 700 sh. com., $10 par)	Feb. 10	.....	$66 for the lot	.....	
Missouri Portland Cement Co. (serial bonds)	Dec. 31	.....	104¾	104¾	3¼% semi-annual
Olympic Portland Cement Co. (g)	Oct. 13	.....	.....	£1⅝	
Phosphate Mining Co. (1)	Nov. 25	.....	1@5	.....	
Pittsfield Lime and Stone Co. (preferred)	.....	100	.....	.....	2% quar. Apr. 1
Simbroco Stone Co. (pfd.)	Dec. 12	.....	.....	.....	$2 Jan. 1
Tidewater Portland Cement Co. (common) (3)	Nov. 25	.....	8⅛	.....	
Vermont Milling Products Co. (slate granules) 5 sh. pfd. and 1 sh. com. (2)	Dec. 30	.....	$1 for the lot	.....	
Winchester Brick Co. (preferred) (sand lime brick) (5)	Dec. 16	.....	10c	.....	

(g) Neidecker and Co., Ltd., London, England. (1) Price obtained at auction by Adrian H. Muller & Sons, New York. (2) Price obtained at auction by R. L. Day & Co., Boston. (3) Price obtained at auction by Weilepp-Bruton & Co., Baltimore, Md. (4) Price obtained at auction by Barnes and Lofland, Philadelphia, Pa. (5) Price obtained at auction for lot of 50 shares by R. L. Day & Co., Boston, Mass. (x) Price obtained at auction by Barnes and Lofland, Philadelphia, on Nov. 3, 1925.

Wolverine Portland 1925 Earnings

NET earnings of the Wolverine Portland Cement Co., Coldwater, Mich., after all charges, in 1925 were $71,898, or 71 cents a share as compared with $258,277 or $2.58 in 1924. After the payment of dividends in the first three-quarters of the year at the rate of 2% quarterly on the 100,000 shares of $10 par stock outstanding, surplus was $2152 as compared with surplus of $65,000 in the previous year after paying 8% regular and 8% extra.

A comparison of the income account for the years ended December 31 follows:

	1925	1924
Net sales	$ 706,995	$1,129,891
Operating expense	644,048	882,025
Operating income	$ 62,947	$ 247,866
Other income	8,951	10,411
Net income	$ 71,898	$ 258,277
Taxes	9,746	32,617
Net earnings	**$ 62,152**	**$ 225,660**
Dividends	60,000	160,000
Surplus	$ 2,152	$ 65,660
Previous surplus	208,367	142,707
Profit and loss surplus	$ 210,519	$ 208,367

Despite the fact that business was at a low rate during the year, little change is seen in the company's balance sheet position. The working capital position is strong with current assets of $546,159 as against current liabilities of $25,657, a ratio of nearly 20 to 1.

A comparison of the balance sheet as of December 31 follows:

ASSETS

	1925	1924
Cash	$ 131,700	$ 255,831
Securities	12,541	10,531
Acc'ts and notes receivable	11,560	19,052
Inventories	390,358	294,434
Current assets	$ 546,159	$ 579,848
Property less depreciation	696,448	704,229
Deferred and other assets	28,236	6,946
Total assets	$1,270,843	$1,291,023

LIABILITIES

Accounts payable	$ 15,917	$ 20,260
Reserve for taxes	9,740	32,618
Current liabilities	$ 25,657	$ 52,878
Capital stock	1,000,000	1,000,000
Surplus	210,519	208,367
Insurance reserve	34,667	29,778
Total liabilities	$1,270,843	$1,291,023

The company expects materially better business this year as evidenced by the increase in inventories of nearly $100,000. When the dividend was passed three months ago the directors stated that it was in order to conserve working capital to meet the demand that is anticipated in the next few months.—*Chicago Journal of Commerce.*

Range of Rock Products Listed Securities in 1925

THE securities of the rock products industries which were actively dealt in and listed on various exchanges in the United States reflected the prosperity enjoyed by the country in the past year. Most of the companies had a good year and the value of their securities was accordingly enhanced. The range in price of such securities on which data was available is shown in the table below:

Company	Par	Per share range for previous year 1925 Lowest	Highest	Per share range since Jan. 1, 1926 Lowest	Highest
International Cement Corp., com.	No par	52 Jan.	81½ Sept.	65 Jan. 13	71⅞ Jan. 21
International Cement Corp., pfd.	100	102½ Nov.	107 Aug.	103¼ Jan. 7	106 Jan. 26
Giant Portland Cement Co., com.	50	.....	.....	37	50
Giant Portland Cement Co., pfd.	50	46 Jan.	59¾ Sept.	34⅝ Jan.	48½ Feb.
Arundel Corp.	No par	33⅓ Aug.	39 July	33½ Jan.	36 Jan.
Wolverine Portland Cement Co.	10	6¾ Nov.	14½ Jan.	5½ Feb.	9½ Jan.
U. S. Gypsum Co., com.	20	112 Feb.	206 Sept.	138 Jan.	161½ Jan.
U. S. Gypsum Co., pfd.	100	112 Jan.	118 Sept.	114½ Jan.	115½ Feb.
Alpha Portland Cement Co., com.	100	108 Dec.	150 Oct.	115 Jan.	135¼ Feb.
Atlas Portland Cement Co., com.	No par	44 June	68 Oct.	50½ Feb.	52⅜ Jan.
Missouri Portland Cement Co., com.	25	41⅛ Feb.	75 Sept.	62 Feb.	67 Jan.
Missouri Portland Cement Co., bonds	100	100½ May	104¾ Dec.	104¾	104¾
North American Cement Corp., bonds	100	97½ Nov. 13	102½ Nov. 16	98¼	100

International Stockholders Now Number 4812

THE latest analysis of the distribution of the preferred and common stocks of the International Cement Corp., disclosed a number of interesting facts. It indicates that, as of September 15, 1925, there were 4812 stockholders, of whom 2072 held the 99,720 shares of preferred stock while 2740 shareholders owned the 500,000 shares of common.

The number of women holding both preferred and common is relatively large, 809 in the case of the former and 958 in the latter instance. Men numbered 1533 among common stockholders and 1090 among the preferred. Trusts and insurance companies numbering 71 and 46, respectively, were included among the preferred and common stockholders.

A total of 1433 individuals held from one to 25 shares of common for a total of 16,258 shares, while 1422 held from one to 25 shares of preferred, total 16,582 shares.

Classified according to amount of stock owned, the holders of common stock number 468 holding from 26 to 50 shares, 308 holding from 51 to 100 shares, 407 holding from 101 to 500 shares, and 124 holding over 500 shares.

The holders of preferred, classified according to number of shares held, number 348 owning from 26 to 50 shares, 203 owning from 51 to 100, 79 owning from 101 to 500, and 20 owning over 500 shares.

Analysis of geographical distribution of common stock shows that Massachusetts leads the list, followed by New York, Texas and Connecticut. A total of 44 states is represented. In addition there are 54 holders of common stock residing outside of the United States.

New York leads the preferred list. Colorado, Massachusetts, Missouri, Connecticut, New Jersey and Illinois follow in the order named. Forty-two states are represented in the list of preferred stockholders while holders outside of the United States number 32.

Missouri Gravel Concern Increases Capital

THE certificate of amendment of articles of agreement of the Lutesville Sand and Gravel Co., Cape Girardeau, Mo., increasing the stock of the company from $40,000 to $100,000 has been filed for record recently The additional stock has been subscribed by H. H. Humpreys and C. L. Whitener, both of Frederickstown. The property of the company, listed at a value of $33,000, consists of two plants for the production of sand and gravel, one plant being located near Patton and the other on Castor river near Marquand, has a lease on 12 acres of land in Madison county. The assets of the company are given at $74,665.04, and there are no liabilities.—*Cape Girardeau (Mo.) Missourian.*

Petoskey Portland Notes Offered

CONTINENTAL and Commercial Trust and Savings Bank, Chicago, are offering at prices to yield 5½ to 6¼%, according to maturity, $1,000,000 of 6% serial gold notes of the Petoskey Portland Cement Co., Petoskey, Mich., in denominations of $1000, due annually December 1, 1926-30, Continental and Commercial Trust and Savings Bank, Chicago, trustees.

These notes are the direct obligation of the Petoskey Portland Cement Co. and are issued under a trust agreement which contains, among other provisions, a covenant that the company's properties and assets are free from all liens and incumbrances, except purchase money liens now existing, securing obligations amounting to $14,500, and excepting also a mortgage on certain real estate owned by the company, valued at approximately $22,000, which mortgage has been expressly subordinated to this issue of notes by the mortgagee. The company further agrees that it will not mortgage, pledge or otherwise incumber any of its properties or assets so long as any of these notes are outstanding or remain unpaid, or provision has not been made for their payment, excepting by way of purchase money liens on hereafter acquired property not exceeding 75% of the purchase price thereof.

The net tangible assets, shown by the certified balance sheet prepared by independent auditors and adjusted to reflect the proceeds of this financing, after deducting all liabilities except these notes, are in excess of $3,300,000. This amount is equivalent to more than $3300 for each note of this $1,000,000 issue. Net current assets alone were over $675,000.

For the two years and 11 months ended November 30, 1925, net earnings available for interest and federal taxes, after deducing all depreciation and depletion, averaged over 3½ times annual interest requirements.

No Split-Up on U. S. Gypsum Stock Before November

THERE will be on split-up in United States Gypsum's common stock before the November meeting, according to S. L. Avery, president. There had been talk of such a step on the report that the stockholders at the annual meeting on February 10 will be asked to approve the reincorporation of the company in some other state than Illinois.

Reincorporation, Mr. Avery said, was planned by the directors in view of the corporation tax charge of $340,000 assessed by the state of Illinois against the company.

This charge, he said, was unjust in view of the fact that the company has no properties located in the state. The alternative course would be to take the matter into court, but a long delay would ensue, although the company is confident of victory. Notice of this proposed change in the charter state probably will be sent to stockholders in the call for the annual meeting.

Mr. Avery declared that the dividend policy of the company is decided at the November meeting of the board and that the directors, after lengthy consideration, decided on the 15% stock dividend a short time ago. This precludes the possibility of action on the much talked of split-up until late in 1926, according to Mr. Avery. This policy has become fairly definitely fixed, as the directors at the end of the year know approximately what results for the twelve months will be.

Further action, therefore, is not due until the meeting in November of this year, Mr. Avery points out. He stated that he knew of no plan for the split-up of the common stock or increased dividends as a result, and added that the letter to stockholders will contain no mention of such possibilities.

United States Gypsum common was the chief feature of a comparatively dull market on the Chicago Stock Exchange. The price moved up sharply and despite Mr. Avery's denial of a split-up there was but little selling. A factor aiding in the rise is that a large block of stock that has been overhanging the market recently has been removed, materially improving the technical position of the market for the stock.—*Chicago Journal of Commerce.*

Universal Gypsum Balance Sheet

THE balance sheet of the Universal Gypsum Co. of Chicago, Ill. (including subsidiaries), as of December 31, 1925, compares as follows:

ASSETS

	1925	1924
Current assets	$1,147,779	$ 737,715
Land and gypsum deposits less depletion	1,960,423	1,985,257
Plant and equipment, less depreciation	2,307,686	1,601,070
Patents, trademarks, etc.	539,640	22,831
Good-will	1	1
Organization and development expense	330,969	247,462
Deferred charges	141,762	166,497
Total assets	$6,428,260	$4,760,833

LIABILITIES

Current liabilities	$ 283,677	$ 270,985
Bonded debt less sinking fund	788,067	911,667
Long term note pay.		15,000
Land mortgage	5,900	
Reserves	58,754	25,258
Preferred stock	2,595,300	2,033,400
Common stock	985,864	1
Subscribed stock	28,329	
Capital surplus	1,373,486	1,378,730
Surplus	308,883	125,792
Total liabilities	$6,428,260	$4,760,833

—*Chicago Journal of Commerce.*

New Egyptian Portland Dividends

AT a recent meeting of the directors of the New Egyptian Portland Cement Co., Detroit, Mich., the regular semi-annual dividend of 4% was declared payable February 1, 1926.

Rockland and Rockport Lime Dividends

THE directors of the Rockland & Rockport Lime Co., Rockland, Me., at a recent meeting have voted to omit the quarterly dividend of 1½% on the common stock due February 1. The regular semi-annual dividends of 3½% on the 1st preferred and of 3% on the 2nd preferred stocks have been declared, both payable February 1.

The company had been paying dividends at the rate of 6% per annum, from Feb. 1, 1924, to Nov. 1, 1925, inclusive, on the common stock.

Standard Silica Company Capitalization

THE company at Dec. 31, 1925, had outstanding:

Capital stock (par $100)	$1,000,000
Bellrose-Standard Silica Co. 1st mortgage 8% bonds, due March 1, 1937	299,500
Crescent Silica Co. 1st mortgage 7% bonds, due Nov. 1, 1933	122,800
Standard Silica Co. 6½% mortgage gold notes, due Oct. 15, 1927	225,000

Officers and directors are: George F. Goodnow, president; Albert C. Goodnow, vice-president; Frank J. Carroll, secretary-treasurer; C. W. Anderson; E. A. Garard.

North American Cement Balance Sheet

THE balance sheet as of December 31 last showed cash and marketable securities of approximately $1,700,000 and total current assets of over $2,700,000 compared with total current liabilities of less than $400,000, a ratio of approximately 7 to 1. Net working capital was over $2,300,000.

Net income for the four months of its corporate existence to December 31 last, it was stated, was equivalent to over three and one-half times interest requirements on its funded debt, and after interest and taxes such income was equivalent to approximately three and one-half times dividend requirements on the 7% cumulative preferred stock.—*Financial Chronicle.*

Dividends Declared

Name of company	Per cent	When payable
Rockland and Rockport Lime, 1st pref.	3½	Feb. 1
Second preferred	3	Feb. 1
Celite Co. (common, quar.)	25c	Feb. 1
Common, extra	25c	Feb. 1
1st and 2nd pref. (quar.)	1⅞	Feb. 1
Canada Cement (pref. quar.)	1¾	Feb. 16
Missouri Portland Cement (quar.)	50c	Feb. 1
U. S. Gypsum (quar.)	2	Mar. 31
Preferred (quar.)	1¾	Mar. 31
New Egyptian Portland Cement (semi-annually)	4	Feb. 1

United States Gypsum Has Record Year

THE United States Gypsum Co., Chicago, Ill., had its record year in 1925, with the final profits, after allowing for preferred dividends and other deductions, equivalent to $15.45 a share on the full amount of capital stock outstanding December 31, as compared with $14.96 a share on a smaller number of shares earned in 1924. Sewell Avery, president, reveals in his annual report to stockholders that the company is making an intensive drive to reduce operating expense.

He points out that $4,241,298 was invested in new plants, additions, and improvements during 1925, and says: "While increases in capacities have resulted from these investments, the major purpose has been to attain that economy of production which an increasingly active competitive condition demands. A liberal program for 1926 has been authorized by the directors and is in action. Its purpose is very largely to reduce costs. Provision to finance these commitments has been made in part by setting aside funds in the government securities listed in the balance sheet."

Mr. Avery devotes considerable space in his report to a review of the building situation, declaring that from now on the industry will have to depend largely upon normal growth of the country for its business. His remarks on the subject follow:

Reviews Post-War Boom

"For the past seven years the building industry has been engaged in making up a building shortage occasioned by conditions incident to the war. Capacities of production, transportation, distribution and erection have in varying degrees been inadequate to these demands during most of this period. The nation's annual construction program has increased from $3,142,000,000 in 1919 to an average of $4,341,000,000 during the past seven years, with a maximum of $6,500,000,000 in 1925. This peak demand of the year just closed has, however, been supplied promptly by manufacturers, transported quickly by railroads, distributed by dealers without delay and erected with speed by the trades. The capacity for construction in all its branches may safely be said to be equal to the present high demand and in several important branches to exceed such demand. Authorities best equipped to much such estimates are convinced that the building shortage generally has been made up and that the building industry will hereafter have to depend upon the normal growth of the country for its business. If these assumptions are correct, a continuation of the present rate of building is improbable and the capacities now supplying it and then in part unemployed wlil create a heightened competition, resulting in reduced prices and smaller profits. In the gypsum industry the conditions reflected in the above are conspicuous. Capacity has been increased and during the year just passed has been in excess of demand.

Competition Is Severe

"Competition in all important branches has been increasingly severe, and prices have continued to decline. Fortunately the steady business enjoyed by the company throughout the year, together with the benefits of earlier investment, has permitted reductions in cost more than equal to the declines in price.

"New products of proven excellence are being successfully introduced to the building trade and hold promises of great growth. Despite the distributing fundamentals above referred to, it is certain that present demand for this company's products is good and so much of the future as is disclosed by building contracts seem to assure a continuation of the present favorable condition for at least six months."

The company's financial statements compare as follows:

INCOME ACCOUNT

Year ended December 31:	1925	1924	1923	1922
Net earnings after exps., repairs and maintenance	$10,474,302	$ 8,825,697	$ 6,848,941	$ 4,370,770
Depreciation and depletion	848,007	670,590	553,323	470,215
Federal taxes	1,212,178	988,725	764,696	481,521
Contingencies	.....	.....	500,000	300,000
Net income	$ 8,414,117	$ 7,166,381	$ 5,030,922	$ 3,119,033
Preferred dividends	579,925	592,077	421,178	418,881
†Common dividends	3,790,002	4,292,515	1,180,490	619,659
Total dividends	$ 4,369,927	$ 4,884,592	$ 1,601,668	$ 1,038,540
Surplus	4,044,189	2,281,789	3,429,253	2,080,493
Surplus paid in on capital stock	150,101	1,301,344	.....	.....
Previous surplus	12,595,681	*9,012,547	5,615,795	3,535,302
Surplus December 31	$16,789,971	$12,595,681	$ 9,045,048	$ 5,615,795
‡Earned a share on common	$15.45	$14.96	$15.59	$12.20

*After adjustments. †Includes stock dividends. ‡Based on $10,138,300 common stock in 1925, $8,786,960 in 1924, $5,911,680 in 1923 and $4,431,040 in 1922.

BALANCE SHEET—ASSETS

December 31:	1925	1924	1923	1922
Plant and property	$22,520,159	$18,626,091	$10,964,563	$ 8,876,055
Gypsum and Gypsite	5,727,500	5,815,500	5,815,500	5,815,500
Treasury holdings	119,118	127,087	14,850	9,256
Deferred charges	238,682	162,341	131,852	149,166
Cash	899,270	1,277,287	477,570	367,921
Marketable securities	6,515,129	4,551,928	3,513,926	1,018,666
Accounts and notes receivable	4,482,106	3,885,913	3,197,713	2,523,375
Erection contract advances	680,458	445,414	687,754	456,607
Inventories	3,319,318	3,107,081	2,004,395	1,531,919
Total assets	$40,205,701	$37,998,646	$26,808,127	$20,748,470

LIABILITIES

Common stock	$10,138,300	$ 8,786,960	$ 5,911,680	$ 4,431,040
Preferred stock	8,741,600	9,032,900	6,020,300	6,013,800
Reserves	1,164,799	5,315,276	3,904,758	2,818,635
Surplus	16,789,971	12,595,680	9,012,547	5,615,795
Accounts payable, including dividends	1,183,038	1,126,980	1,059,523	1,213,946
Taxes, interest, etc., accrued	1,697,992	1,140,848	899,138	655,253
Total liabilities	$40,205,701	$37,998,646	$26,808,127	$20,748,470

WORKING CAPITAL

Current assets	$15,896,282	$13,267,625	$ 9,881,361	$ 5,898,490
Current liabilities	2,881,030	2,267,829	1,958,841	1,869,200
Working capital	$13,015,252	$10,999,796	$7 ,922,519	$ 4,029,290

—*Chicago Journal of Commerce.*

Rockland and Rockport Lime to Retire Part of First Mortgage Bonds

THE Boston Safe Deposit and Trust Co., Boston, Mass., has asked holders of Rockland and Rockport Lime Corp. first mortgage, 6% gold bonds due 1940 to submit sealed proposals for the sale of the same to the sinking fund in order to absorb $13,352 or any part of this amount. This proposed retirement of bonds is in accordance with the terms of the mortgage indenture dated February 2, 1920.

Canada Cement Company Purchases Hanover Cement and Stone Properties

THE Hanover Cement and Stone Co., Hanover, Ont., have sold their entire plant to the Canada Cement Co., Montreal, Que., for the sum of $290,000 cash, and bondholders will receive a first payment of 75 cents on the dollar within a short time, with further payment later.

Pennsylvania Gypsum Company Buys Plaster Plant

THE Pennsylvania Gypsum Co. has purchased the Keystone Plaster Co.'s plant at Chester, Penn., which has been unused for several years. The plant will be placed in operation shortly. A contract has been made with the Ingonish Gypsum Co., Ltd., of Cape Breton, Nova Scotia, for raw materials. The company will manufacture the usual gypsum products of plaster and white coating, also blocks and wall board.

The company will have a capitalization of 5000 shares of preferred stock of $100 par value and 10,000 shares of common stock without nominal or par value and will be controlled by the regulations as they now hold in the state of Delaware.

At the organization meeting, R. E. Haire of Paris, Ontario, was elected president; F. P. Jones, vice-president; J. H. Robinson, Windsor, N. S., superintendent. The board is made up of H. J. Fuller, New York; A C. Tagge, Montreal; W. P. Maguire, Philadelphia, and Charles Hart, Chester.—*Philadelphia (Penn.) Enquirer.*

According to the *Wall Street Journal,* the Canada Cement Co., Montreal, controls the Pennsylvania Gypsum Co. and will make gypsum products at the Chester, Penn., plant, using the raw gypsum from their deposits in Cape Breton, N. S.

Correction

IN the report of Interstate Commerce Commission's hearing on sand and gravel freight rates at Kansas City, January 8 and 9, in ROCK PRODUCTS, January 23, p. 64, it was stated that H. M. Robbins, of the Robbins-Young Sand and Gravel Co., of Minneapolis, Minn., testified regarding the experience of his company. This should have read C. H. Young.

Cement Products

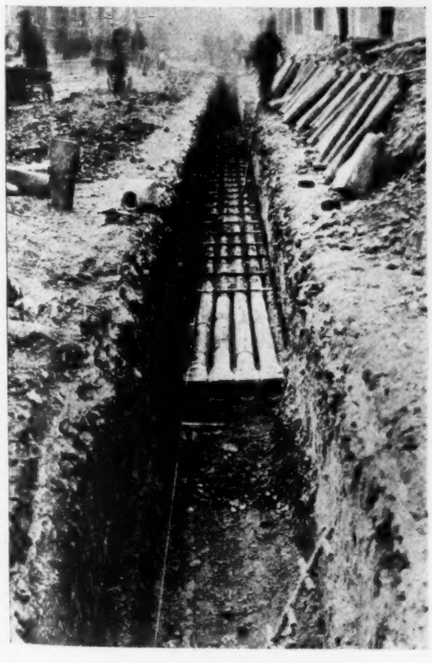
TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Electrical Conduits as a Cement Product

Commonwealth Edison Company of Chicago Has Used Over 20,000,000 Feet in the Last 30 Years and Still Requires Over 2,000,000 Feet Per Year

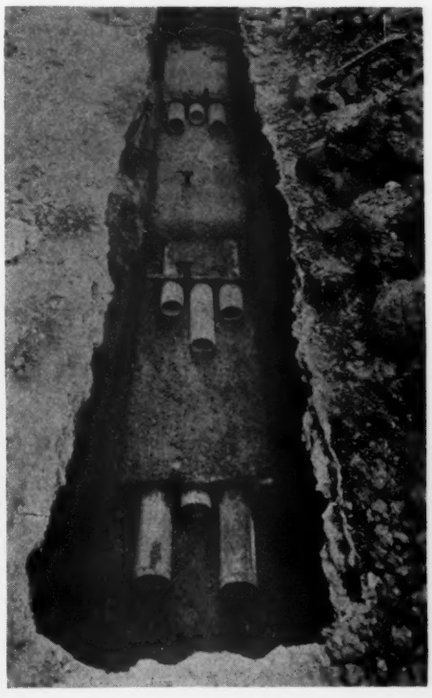
By A. J. R. Curtis

IN most cities over 50,000 population underground conduits have proved the most satisfactory means for the transmission and distribution of electric light and power. Underground conduits have been used to some extent for over 40 years and, although the initial cost of this type of construction is greater than for overhead installations, final results prove it the most economical because of the greatly reduced cost of maintenance of such a system. Overhead lines are unsightly, incur danger to life, and are subject to frequent breakdowns with interruptions to service during storms.



Single tier of concrete conduits on concrete footing. Note general appearance of trench footing, spacers, and finisher sections in foreground

At present concrete conduit, fibre pipe, and the multiple and single form of vitrified clay duct are all used to some extent for electrical transmission. All of these are



Multiple tier construction, using concrete conduit

placed in the same general manner. The single conduits or ducts are ordinarily installed in clusters of 4, 6, 9, or 12 lines, with joints staggered and duct lines separated by 1 in. of cement mortar, and the group of ducts entirely surrounded by concrete with a minmium thickness of 3 in.

The concrete conduits (or "stone conduits" as referred to commercially), are made in lengths of 3 ft., with an internal diameter of 3½ in. and a shell thickness of ⅝ in. Duct lines are usually laid at a sufficient depth to provide a cover of 2½ ft. over the top of the upper 3-in. layer of concrete.

Essential Qualities

An experienced workman with one helper can lay about 2,000 duct feet of concrete conduit in a prepared trench in an 8-hour day. After conduits are laid, the lines are rodded and a steel mandrel, ¼ or ⅛ in. smaller in diameter than the inside diameter of the duct, is drawn through each line to insure that there are no obstructions and no offsets at the joints which will prevent or make more difficult the drawing of the

Close-up view of single tier with manhole junction or finisher section

cables through the duct lines.

A primary essential of any duct line is that it be designed and constructed in such a manner so as to offer the least possible frictional resistance to the passage of lead-covered cable. This requires an extremely smooth interior surface of the conduit and no appreciable offsets at the joints, which would tend to shave off the lead covering as the cable is pulled through.

Another essential characteristic that any conduit must have is that of effectively resisting the passage of electric arcs. Although the duct material cannot prevent a burnout in a cable it should prevent the communication of this burnout to cables in adjoining lines and, after extended observation and experience, numerous electrical engineers believe that concrete meets this requirement better than any other duct material.

In this connection the report of the committee on underground construction of the National Electric Light Association in the 1911 proceedings contains the following statement: "Conduit built with fiber or with concrete duct material and having tight joints resists the action of the heat of a cable short-circuit, either high tension or low tension, much better than conduits built of tile and with butted joints."

As to the ability of concrete in comparison with other duct materials to resist passage of arcs the same committee in the 1920 proceedings of N. E. L. A. stated as follows: "Concrete ducts being round, are laid with a minimum of 1 in. of concrete between adjacent ducts, with ⅝-in. duct walls. This gives over 2 in. of concrete between cables in adjacent ducts, and the *committee has been unable to find any record of a burnout, of either high or low tension cable in concrete duct, communicating through the conduit to the cable in an adjacent duct.*"

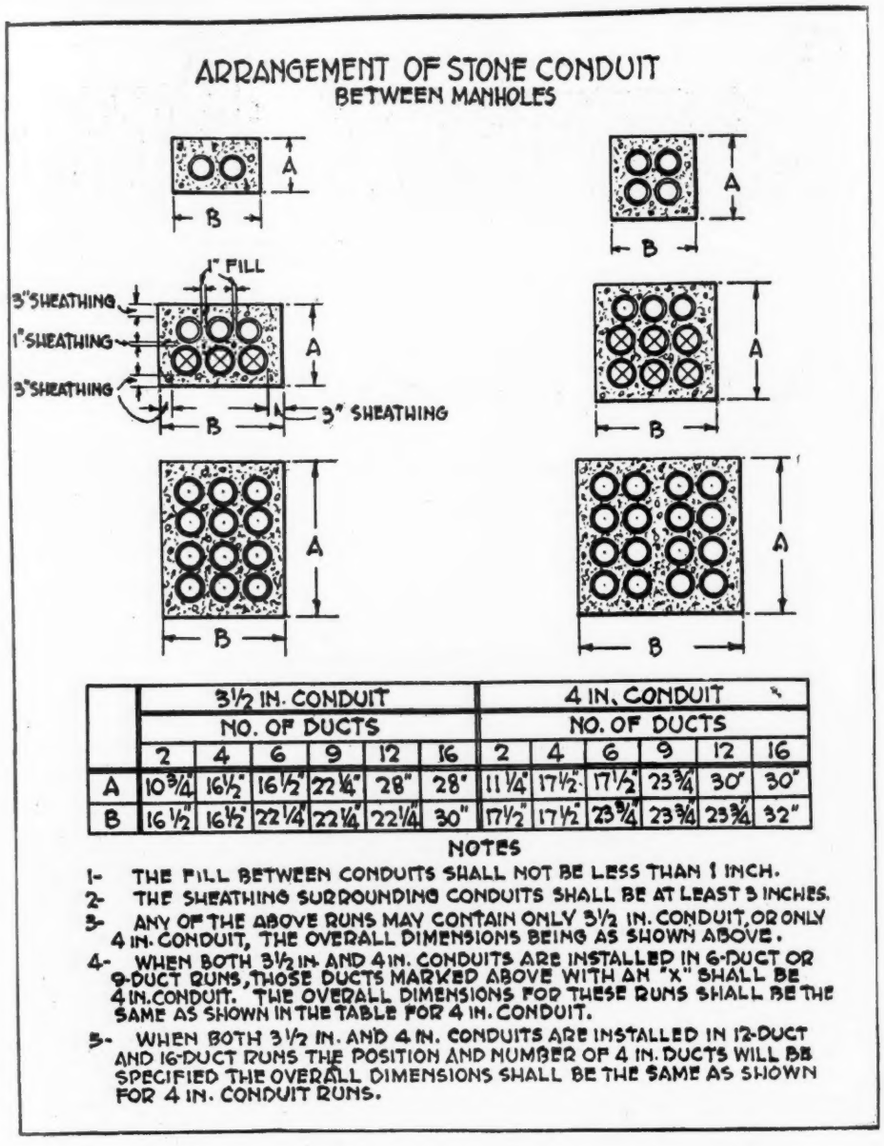
"Fibre ducts have inherently no great resistance to arcs, but their principal function is to serve as a mold for the concrete and the protection against troubles of this kind is afforded solely by the concrete between the ducts." (Minimum thickness of concrete between fibre ducts is ordinarily 1½ in.)

"Vitrified tile readily melts where exposed to arcs, and the trouble is particularly disastrous in the case of low tension cables which are not quickly disconnected in case of trouble. Numerous cases are on record where burnouts of low tension cables carried in vitrified tile conduits have melted the duct materials so that the molten tile and lead and copper have solidified into one solid mass and none of the cables in the conduit could be withdrawn. Such cases of trouble cause serious delays in the restoring of service, because they necessitate the digging up of the conduit, the removal of solidified tile, lead and copper, the removal of all the cable in the conduit, and the replacing of the damaged portion of the conduit, and later the replacing of all the cables."

In 1922 a questionnaire was sent out by the underground construction committee of N. E. L. A. to a large number of electric light and power companies regarding the use of cement coverings for fireproofing cables in manholes. The use of such fireproofing material was found from the replies to be the common practice of a great many concerns and the number of cases where corrosion of lead under cement fireproofing has occurred is very small. It is apparent in some cases that the trouble is cathodic corrosion, due to the cable sheath being strongly negative to the adjacent electric rails during a portion of the day.

The following paragraphs relative to cathodic corrosion are quoted from the 1922 report of the above mentioned committee:

"If the cable sheaths are several volts negative to the surrounding rails or pipes during a portion of the time and at about the same potential as the rails during several hours, as, for example, during the light load period in the early morning hours, then the cement will be decomposed by the action of the stray currents when the lead sheath is several volts negative and the alkaline products of this decomposition will attack the lead when the current ceases to flow. If the trouble is due to this cause, the difficulty can sometimes be removed by altering the conditions so that the cable sheaths will not be so strongly negative during the heavy load period on the adjacent electric railways."



	3½ IN. CONDUIT NO. OF DUCTS						4 IN. CONDUIT NO. OF DUCTS					
	2	4	6	9	12	16	2	4	6	9	12	16
A	10¾"	16½"	16½"	22¼"	28"	28"	11¼"	17½"	17½"	23¾"	30"	30"
B	16½"	16½"	22¼"	22¼"	22¼"	30"	17½"	17½"	23¾"	23¾"	23¾"	32"

NOTES

1- THE FILL BETWEEN CONDUITS SHALL NOT BE LESS THAN 1 INCH.
2- THE SHEATHING SURROUNDING CONDUITS SHALL BE AT LEAST 3 INCHES.
3- ANY OF THE ABOVE RUNS MAY CONTAIN ONLY 3½ IN. CONDUIT, OR ONLY 4 IN. CONDUIT, THE OVERALL DIMENSIONS BEING AS SHOWN ABOVE.
4- WHEN BOTH 3½ IN. AND 4 IN. CONDUITS ARE INSTALLED IN 6-DUCT OR 9-DUCT RUNS, THOSE DUCTS MARKED ABOVE WITH AN "X" SHALL BE 4 IN. CONDUIT. THE OVERALL DIMENSIONS FOR THESE RUNS SHALL BE THE SAME AS SHOWN IN THE TABLE FOR 4 IN. CONDUIT.
5- WHEN BOTH 3½ IN. AND 4 IN. CONDUITS ARE INSTALLED IN 12-DUCT AND 16-DUCT RUNS THE POSITION AND NUMBER OF 4 IN. DUCTS WILL BE SPECIFIED THE OVERALL DIMENSIONS SHALL BE THE SAME AS SHOWN FOR 4 IN. CONDUIT RUNS.

Specifications and plan for laying concrete conduits used by Commonwealth Edison Co.

Advantages of Concrete

"A number of companies have used a large amount of cement-lined iron pipe for conduits in the earlier days and more recently large quantities of concrete pipe have been used by some companies. The fact that these companies are not having trouble due to the lead sheath being in contact with the concrete, indicates that the trouble is not due primarily to the action of cement or concrete on lead, but that it is due to some local conditions such as cathodic corrosion above described."

As stated above conduit lines are usually placed only 2½ ft. below the surface of the street and are therefore subject to impact caused by passing vehicles. Electrical engineers state that concrete conduits withstand this impact far better than other materials. At a depth of 2½ ft., conduits are also subject to action of frost. Concrete conduits successfully resist such action.

Little variation in the concentricity of inner and outer circumference is found in concrete conduits properly fabricated and the ends are perpendicular to the barrel, which features facilitate the construction of even and smooth joints quickly and easily, such joints being essential to good conduit construction.

Although the first cost per duct foot of the various types of duct materials has been approximately the same for a number of years, experience has shown that the maintenance cost of a system using concrete is far less than that of the systems using other materials, the reason for this being that, as stated above, concrete conduit is less liable to damage from shock or vibration caused by passing vehicles, more resistant to frost action and not appreciably affected by cable burnouts.

Extensive Use of Concrete

In many cities throughout the country concrete conduits have been used by electric lights and power companies for a number of years with advantages which are brought out by the rapidly increasing number of duct feet installed each year.

Probably the best illustration of this fact is afforded by citing as an example the Commonwealth Edison Co. of Chicago, which now uses concrete conduits in preference to other types and maintains (under a subsidiary company) its own plant for the manufacture of this material. This plant, located on the Chicago river at Addison street, is equipped with 4 McCracken machines for making "stone" conduit pipe together with the necessary facilities for handling materials, and handling and curing the finished product. A separate room is used for making curves and other special fittings which are molded by hand. The concrete used is of the so-called semi-dry consistency mixed 1 part of portland cement to 3 parts of No. 2 torpedo sand or limestone screenings. The conduits are cured for a period of not less than 8 weeks after removal from the molds, being kept wet by sprinkling the first six weeks and then allowed to dry in the air for two weeks before being used.

Although the capacity of this plant is about 3000 duct feet per day or about 900,000 ft. per year it was unable to supply the demand in 1923 and the company was compelled to resort to the use of fibre duct. To overcome this situation a contract was awarded to others for the manufacture of 3,000,000 ft. and which has since been delivered and laid.

The Commonwealth Edison Co. engineers estimated that they have used over 20,000,000 ft. of stone conduit during the past 30 years and estimate their present requirements at approximately 2,000,000 duct feet per year.

Specifications for Stone Concrete Conduits

American Railway Engineering Association

Note—Since these specifications were prepared the Commonwealth Edison Co. has discarded machines previously used in the fabrication of conduit in 5-ft. sections and are now successfully using modern machines of the packer head type, making conduit 3 ft. long and 3½ in. internal diameter.

1. MATERIAL. Stone conduit shall be made of limestone screenings or sand which will pass through a screen of one-eighth (⅛) in. mesh and approved make of portland cement in the proportion of four and three-quarters (4¾) to one (1) properly moistened with water and shall be formed by tamping in cylindrical molds.

2. DIMENSIONS. Conduit shall be made in lengths of five (5) ft. with five-eighths (⅝) in. walls and three and one-half (3½) to four and one-half (4½) in. round bore.

3. WORKMANSHIP. (a) Conduit shall be symmetrical throughout, straight, true, smooth, free from cracks, air holes uneven surfaces or other imperfections which will injuriously affect it. The ends shall be perpendicular to the bore.

(b) Conduit shall be cured for not less than eight (8) weeks after removal from the mold. For the first six (6) weeks it shall be kept wet by sprinkling and then allowed to dry in the air for at least two (2) weeks.

4. JOINTS. (a) Conduit when thoroughly cured shall be turned, for a distance of three-quarters (¾) of an inch on each end, sufficient to secure an exact diameter concentric with the bore, but which shall not reduce the thickness of the wall given in Section 2 by more than one-sixteenth (1/16) of an inch.

(b) With each conduit there shall be supplied a suitable metal sleeve which will fit tightly over the ends of adjacent conduits to hold them in place and to secure perfect alignment.

5. SHORT LENGTHS. Pieces of conduit less than the standard five feet length will be accepted, not to exceed 10% of the total ordered, provided the ends are cut square, dressed and turned for metal sleeves, but no conduit will be accepted less than two and one-half (2½) ft. long.

6. INSPECTION. (a) The railraod may inspect the conduit at any time during the process of manufacture and shall be furnished free of cost the necessary tools and appliances for making such tests as are necessary to determine if the requirements of these specifications have been met.

(b) Conduit offered for inspection shall be factory run from which no conduit of a superior quality has been removed.

(c) The railroad shall be given advance notice of completion of conduit to permit it to arrange for inspection.

7. TESTS. (a) Conduits shall permit the passage from end to end of a mandrel three (3) ft. long and one-eighth (⅛) in. less than the nominal diameter of the bore.

(b) Samples of five (5) ft. lengths of conduit shall be selected at random and after immersion for twenty-four (24) hours in water shall show an increase in weight of not more than nine-tenths (9/10) of 1%.

(c) The presence of cracks shall be determined by sounding each piece with a steel hammer or its approved equivalent. Pieces which fail to give a clear metallic ring shall be considered defective.

(d) Conduit which fails to meet all of the requirements of these specifications shall be rejected.

8. INSTALLATION. (a) Conduit line shall be encased in concrete four (4) in. thick on top, three (3) in. on the sides and a minimum thickness of four (4) in. for the full width of the trench, except where ledge rock is encountered; in which case the concrete foundation may be omitted and the bottom of the trench leveled with cement mortar. Conduits shall be laid with a minimum separation of one (1) in. both horizontally and vertically and the joints shall be staggered so that the joints of adjacent sections will be separated by at least three (3) in.

(b) In ending conduits only full lengths shall be used in the lower tier at the entrance to splicing chambers. Short lengths where necessary shall be inserted further out in the section.

(c) Where work is suspended leaving incompleted sections the open ends of the conduits shall be plugged with tapered wood, or other approved plug conforming accurately to the shape of the bore and so formed that it cannot be forced entirely within the opening.

(d) During construction work a mandrel three (3) ft. long and one-eighth (⅛) in. less than the nominal bore shall be drawn through the conduits as they are laid.

(e) In other respects the methods of laying stone conduits shall correspond to the American Railway Engineering Association Specifications for Fiber Conduits.

Advance Convention Program of Concrete Products Association

THE following program has been arranged for the annual convention of the National Concrete Products Association to be held at the Hotel Sherman, February 25 and 26:

THURSDAY

9:00 A. M.—Registration.

9:30 A. M.—Members will attend American Concrete Institute sessions on technical aspects of concrete products.

2:00 P. M.—Concrete products manufacturers session on technical problems. "Fire Insurance Rates on Concrete Masonry," A. J. R. Curtis; "Economical Plant Operation," Austin Grabbs; "The Promotion Value of a Good Building Code," D. R. Collins.

4:00 P. M.—Round table discussion.

7:00 P. M.—Directors meeting.

FRIDAY

9:30 A. M.—Subjects pertaining to sales and advertising. "Successful Sales Methods," John Powers; "Selling Material for Factory Construction," C. O. Gochnauer; "Direct-by-Mail Advertising," Jacob Bosch; "Freight Rates on Concrete Products," F. E. Guy.

2:00 P. M.—Business session.

"Lone Star" Adopted as Brand Name for All International Cement

ALL the cement produced and marketed by the various companies of the International Cement Corp. system will now be sold under the brand "Lone Star." This change was made effective January 1. The change is not so sudden for the respective names employed by various plants in the system such as the Knickerbocker Portland Cement Co. have designated their product as "Knickerbocker Cement—Lone Star Brand," etc. The adoption of a single brand name is seen as a sound marketing procedure.

Portland Cement Output in January

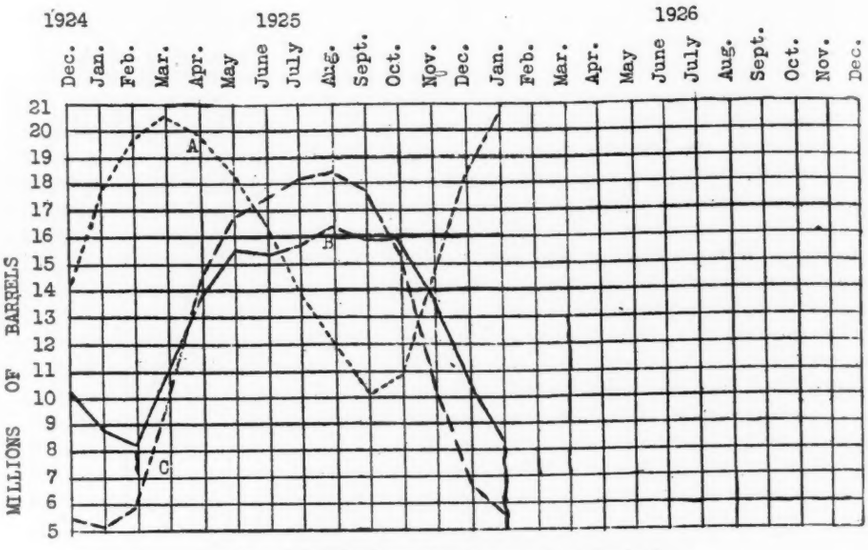
Shipments for Month Total 5,721,000 Barrels

JANUARY shipments of portland cement were the highest for that month in any year and show an increase of nearly 11% as compared with January, 1925, according to the Bureau of Mines, Department of Commerce. Production shows a decrease of 824,000 bbl., while stocks of portland cement have never been exceeded and are over 17% greater than at the end of January, 1925. The following tables, prepared by the Division of Mineral Resources and Statistics of the Bureau of Mines are compiled from reports for January, 1926, received direct from all manufacturing plants except one, for which estimates were necessary on account of lack of returns.

Clinker Stocks

Stocks of clinker, or unground cement, at the mills at the end of January, 1926, amounted to about 8,939,000 bbl. compared with 6,469,000 bbl. (revised) at the beginning of the month.

An estimate of the unground clinker by months is given in the last table.


1924
1925
1926
Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
MILLIONS OF BARRELS
21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5
A
B
C

(a) Stocks of finished portland cement at factories.
(b) Production of finished portland cement.
(c) Shipments of finished portland cement from factories.

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during November and December, 1924 and 1925.

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES, IN NOVEMBER AND DECEMBER, 1924 AND 1925, IN BARRELS*

Shipped—	November, 1924	November, 1925	December, 1924	December, 1925
Alabama	189,796	161,142	121,826	108,906
Alaska	231	132	173	132
Arizona	43,541	36,310	37,459	61,646
Arkansas	87,735	43,423	41,627	43,281
California	847,700	972,874	738,110	938,721
Colorado	89,116	61,541	38,782	30,872
Connecticut	114,986	148,990	59,533	56,260
Delaware	31,546	24,504	7,884	13,680
District of Columbia	62,633	106,642	41,729	57,119
Florida	220,005	251,285	263,031	439,786
Georgia	148,597	104,559	121,333	69,046
Hawaii	835	8,410	1,164	20,735
Idaho	11,300	19,245	6,036	15,993
Illinois	865,928	817,588	328,101	407,808
Indiana	267,367	233,595	121,574	114,856
Iowa	129,877	96,762	31,141	41,325
Kansas	172,934	172,945	62,541	87,368
Kentucky	153,650	99,170	58,064	63,382
Louisiana	104,021	75,513	61,252	74,464
Maine	20,649	17,453	8,053	7,028
Maryland	180,594	140,656	87,137	85,377
Massachusetts	265,416	258,733	140,103	133,365
Michigan	582,371	537,713	178,516	302,889
Minnesota	136,398	168,138	59,101	62,943
Mississippi	39,553	53,244	33,644	34,740
Missouri	362,170	478,531	121,461	207,230
Montana	8,974	13,819	6,923	7,382
Nebraska	83,880	82,528	28,363	34,633
Nevada	7,378	5,751	2,681	4,015
New Hampshire	27,402	35,808	16,176	22,586
New Jersey	463,036	566,337	290,069	329,054
New Mexico	11,492	16,735	6,271	10,258
New York	1,230,384	1,249,902	737,623	889,639
North Carolina	255,535	200,447	126,363	152,699
North Dakota	2,876	9,531	132	2,474
Ohio	646,386	545,452	221,142	339,030
Oklahoma	187,776	226,437	118,645	148,354
Oregon	68,474	73,583	43,844	46,531
Pennsylvania	945,003	945,344	436,794	597,328
Porto Rico	500	577	0	0
Rhode Island	44,833	50,609	23,818	26,721
South Carolina	57,325	69,234	47,310	54,545
South Dakota	15,263	14,080	3,627	6,379
Tennessee	140,872	104,657	71,319	80,322
Texas	314,451	280,852	236,875	284,061
Utah	17,579	24,607	6,316	21,135
Vermont	12,923	9,301	4,557	4,066
Virginia	144,604	104,185	73,039	72,698
Washington	91,356	106,111	49,976	82,364
West Virginia	114,229	80,179	47,324	63,066
Wisconsin	192,256	173,988	55,172	77,100
Wyoming	12,484	9,403	9,513	7,968
Unspecified	17,199	29,247	7,203	8,140
	10,243,419	10,117,802	5,440,450	6,851,500
Foreign countries	45,581	69,198	65,550	65,500
Total shipped from cement plants	10,289,000	10,187,000	5,506,000	†6,917,000

*Includes estimated distribution of shipments from three plants each month. †Revised.

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES, IN DECEMBER, 1925*

Exported to—	Barrels	Value
Canada	1,172	$4,158
Central America	14,388	38,854
Cuba	21,372	50,430
Other West Indies	5,444	13,376
Mexico	5,604	19,431
South America	46,924	144,481
Other countries	5,419	26,170
	100,323	$296,900

*Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision.

†Imports and exports in January, 1926, not available.

IMPORTS AND EXPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1924 AND 1925

Month	Imports 1924 Barrels	Imports 1924 Value	Imports 1925 Barrels	Imports 1925 Value	Exports 1924 Barrels	Exports 1924 Value	Exports 1925 Barrels	Exports 1925 Value
January	153,839	$250,799	231,258	$364,196	88,586	$252,497	71,596	$207,547
February	162,930	219,588	119,077	206,308	62,606	194,110	56,249	181,356
March	160,517	254,745	218,048	337,039	91,224	254,687	65,248	200,410
April	148,137	227,300	197,686	280,826	83,200	229,183	89,508	263,831
May	161,304	232,950	186,897	286,959	88,850	262,290	85,385	250,845
June	196,655	283,112	254,937	409,539	74,064	229,852	71,343	217,899
July	108,944	181,111	335,118	499,602	60,139	186,073	98,141	286,543
August	192,634	305,690	379,847	611,551	85,883	251,904	103,961	289,904
September	138,369	232,991	513,252	789,121	69,470	206,921	102,649	285,225
October	214,987	337,199	535,050	824,268	79,180	253,479	73,369	228,467
November	198,806	305,598	388,604	678,518	42,490	130,519	101,825	294,201
December	173,814	285,481	295,543	526,001	52,851	163,639	100,323	296,900
	2,010,936	$3,116,564	3,655,317	$5,813,928	878,543	$2,615,154	1,019,597	$3,005,128

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN JANUARY, 1925 AND 1926, AND STOCKS IN DECEMBER, 1925, IN BARRELS

Commercial district—	Production—January, 1925	Production—January, 1926	Shipments—January, 1925	Shipments—January, 1926	Stocks at end of January, 1925	Stocks at end of January, 1926	Stocks at end of December, 1925*
E'n Penn., N. J. & Md.	2,267,000	2,765,000	1,006,000	1,467,000	3,749,000	3,805,000	2,507,000
New York	533,000	623,000	148,000	205,000	1,167,000	1,447,000	1,028,000
Ohio, W'n Penn. & W. Va.	764,000	523,000	346,000	382,000	1,788,000	2,455,000	2,314,000
Michigan	208,000	292,000	191,000	212,000	987,000	1,994,000	1,913,000
Wis., Ill., Ind. & Ky.	1,572,000	611,000	705,000	525,000	2,908,000	3,594,000	3,508,000
Va., Tenn., Ala. & Ga.	967,000	961,000	706,000	845,000	730,000	966,000	850,000
E'n Mo., Ia., Minn. & S. Dak.	711,000	511,000	332,000	281,000	3,138,000	3,054,000	2,824,000
W'n Mo., Neb., Kans. & Okla.	315,000	225,000	220,000	325,000	1,577,000	1,556,000	1,657,000
Texas	304,000	330,000	280,000	308,000	378,000	502,000	479,000
Colo. & Utah	80,000	31,000	55,000	63,000	341,000	273,000	305,000
California	1,059,000	1,034,000	1,029,000	984,000	525,000	533,000	484,000
Ore., Wash. & Mont.	76,000	126,000	144,000	124,000	368,000	498,000	496,000
	8,856,000	8,032,000	5,162,000	5,721,000	17,656,000	20,677,000	18,365,000

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1925 AND 1926, IN BARRELS

Month—	Production 1925	Production 1926	Shipments 1925	Shipments 1926	Stocks at end of month 1925	Stocks at end of month 1926
January	8,856,000	8,032,000	5,162,000	5,721,000	17,656,000	20,677,000
February	8,255,000	.....	6,015,000	.....	19,689,000	.....
March	11,034,000	.....	10,279,000	.....	20,469,000	.....
First quarter	28,145,000	.....	21,456,000	.....	.....	.....
April	13,807,000	.....	14,394,000	.....	19,877,000	.....
May	15,503,000	.....	16,735,000	.....	18,440,000	.....
June	15,387,000	.....	17,501,000	.....	16,409,000	.....
Second quarter	44,697,000	.....	48,630,000	.....	.....	.....
July	15,641,000	.....	18,131,000	.....	13,896,000	.....
August	16,419,000	.....	18,383,000	.....	11,952,000	.....
September	15,939,000	.....	17,711,000	.....	10,247,000	.....
Third quarter	47,999,000	.....	54,225,000	.....	.....	.....
October	15,992,000	.....	15,309,000	.....	10,979,000	.....
November	13,656,000	.....	10,187,000	.....	14,534,000	.....
December	*10,713,000	.....	*6,917,000	.....	*18,365,000	.....
Fourth quarter	40,361,000	.....	32,413,000	.....	.....	.....
	161,202,000	.....	156,724,000	.....	.....	.....

*Revised.

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN DECEMBER, 1925

Imported from—	District into which imported—	Barrels	Value
Belgium	Florida	100,520	$188,732
	Massachusetts	3,997	5,676
	Mobile	17,545	35,589
	New Orleans	7,137	13,169
	Oregon	14,661	16,040
	Porto Rico	3,003	4,248
	Total	146,863	$263,454
Canada	St. Lawrence	197	$294
Denmark	Florida	31,574	$51,975
	Porto Rico	46,087	57,463
	Total	77,661	$109,438
France	New Orleans	6	$20
Germany	New Orleans	1,442	$1,550
Japan	Hawaii	3,700	$6,519
Norway	Florida	55,522	$127,242
	Massachusetts	9,455	15,593
	Total	64,977	$142,835
United Kingdom	Los Angeles	697	$1,887
	Oregon	.....	4
	Total	697	$1,891
	Grand total	295,543	$526,001

EXPORTS OF HYDRAULIC CEMENT, BY COUNTRIES, IN 1925

Exported to—	Barrels	Value
Canada	16,487	$69,760
Central America	96,123	265,363
Cuba	334,863	791,651
Other West Indies	73,937	182,634
Mexico	136,957	390,493
South America	314,933	1,035,615
Other Countries	46,297	267,612
	1,019,597	3,003,128

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII, AND PORTO RICO, IN DECEMBER, 1925*

	Barrels	Value
Alaska	479	$1,626
Hawaii	6,860	15,194
Porto Rico	9,440	22,001
	16,779	38,821

*Compiled from records of the Bureau of Foreign and Domestic Commerce and subject to revision.

ESTIMATED CLINKER (UNGROUND CEMENT) AT THE MILLS AT END OF EACH MONTH, 1925 AND 1926, IN BARRELS

Month	1925	1926
January	7,017,000	8,939,000
February	8,497,000	.....
March	9,962,000	.....
April	9,731,000	.....
May	9,053,000	.....
June	7,937,000	.....
July	6,961,000	.....
August	5,640,000	.....
September	4,561,000	.....
October	4,086,000	.....
November	5,013,000	.....
December	6,469,000*	.....

*Revised.

Minnesota Awards Cement Contracts for 1926

THE Minnesota Highway Department recently awarded contracts for approximately 500,000 bbl. of cement to be used during 1926 in the construction or paving of state trunk highways. Preference was given wherever possible to cement made in Minnesota mills.

The year's purchase totaling 499,680 bbl. was divided among five bidders. The Universal Portland Cement Co., Minneapolis, offering Minnesota-made cement, was awarded contracts for 274,230 bbl. The Lehigh Portland Cement Co., Mason City, Iowa, received contracts for 101,420 bbl.; the Northwestern States Portland Cement Co., Mason City, for 56,360 bbl.; the Cutler-Magner Co., Duluth, offering Huron cement, 37,380 bbl., and the Interstate Lumber Co., Stillwater, 30,290 bbl.

Although contracts will call for f.o.b. deliveries at the various construction projects, most of which have been made public, C. M. Babcock, commissioner of highways, said the awards are at a uniform price of $1.80 a barrel at the mills. On a basis of price per barrel delivered on the particular project the Universal company will receive from $2.52 to $2.75; the Lehigh company from $2.64 to $2.68; the Northwestern States company from $2.56 to $2.66; Cutler-Magner Co. from $2.64 to $2.73, and the Interstate Lumber Co., $2.64. These prices are further subject to a 10 cents per barrel discount for cash payment.

Pyramid Portland Combines Iowa and New Jersey Plants

THE Pyramid Portland Cement Co. of New Jersey has taken over the Pyramid Portland Cement Co. organized in Iowa in 1920, officers of the local plant at Valley Junction, Iowa, announced recently.

The New Jersey corporation will assume the indebtedness of the Iowa plant and will continue to produce cement at Valley Junction and increase the facilities.

F. H. Mackaman, president of the Iowa plant, has been named to head the enlarged corporation. H. W. Lanphere is sales manager and P. J. Boberg is general superintendent.—*Des Moines (Iowa) Register.*

R. C. Newhouse Joins Staff of Cowham Engineering Company

FOLLOWING his recent resignation as chief engineer of the crushing and cement machinery department of the Allis-Chalmers Manufacturing Co., Chicago, R. C. Newhouse is now vice-president and manager of the engineering department of the Cowham Engineering Co., Chicago. Mr. Newhouse has been identified with cement plant operation, design, construction and in the rock products industries for a long time.

R. C. Newhouse

After graduation from Ohio Wesleyan University, Mr. Newhouse was employed by the Casparis Stone Co. and the Columbus Construction Co. of Columbus, Ohio. In 1905 he joined the Allis-Chalmers Manufacturing Co. as a sales engineer in the crushing and cement machinery department. He was transferred in 1910 to the main office in Milwaukee where he was in charge of the cement mill machinery and crushing department until his recent resignation. While connected with the Allis-Chalmers company, Mr. Newhouse visited a large number of cement plants in the United States, Canada, and Europe, and was responsible for the design and construction of cement plants and crushing plants in different parts of the world. He has contributed many ideas on the design and operation of cement plant and crushing machinery which have enhanced the efficiency of these operations.

In his position as chief engineer, Mr. Newhouse invented and patented the Fairmount crusher, grid frame division head compeb mill, combination division head compeb mill, the Concavex, the Newhouse gyratory crusher. He also has had granted numerous patents covering gyratory crushers, jaw crushers, dust collectors, crushing rolls, conveying and transporting machinery, control systems for electric shovels, control systems for automatically operated hoists, and other similar devices connected with the crushing, cement, and mining industries.

Mr. Newhouse is a member of the American Society of Mechanical Engineers and the Milwaukee Engineering Society, as well as several other professional and social clubs.

As manager of the engineering department of the Cowham Engineering Co., Mr. Newhouse will have charge of the operation of the cement plants controlled by the company, among which are the Signal Mountain Portland Cement Co., Chattanooga, Tenn., and the Peninsula Portland Cement Co., Cement City, Mich., and two other plants, one at Tampa, Fla., called the Florida Portland Cement Co., and another at La Salle, Ill., called the Central States Portland Co., which are soon to be built.

Adelmer Marcus Bates

WE publish below a portrait of A. M. Bates, inventor of the Bates valve bag, which was received too late to accompany the obituary notice in ROCK PRODUCTS of February 6, 1926. Probably few men have had a greater influence in the development of the portland cement and hydrated lime industries, and probably few patents ever issued in the United States were more iron-clad and infringement-proof than those issued to Mr. Bates for his valve-bag and bag-filling machine inventions.

A. M. Bates

A Consulting Engineer in Rock Products Industry

LOYD WILSON, recently with the Solvay Process Co., Syracuse, N. Y., announces the opening of an office at 854 Buhl building, Detroit, Mich., as a consulting engineer, specializing in the rock products industries.

Mr. Wilson graduated from Rensaelaer Polytechnic Institute with the degree of civil engineer in 1903. Most of the year 1904 he spent in the Isthmus of Panama on survey work for the Panama Canal. He was first employed by the Solvay Process Co. in 1905 on general engineering work. From 1910

Loyd Wilson

to 1916 he was engineer for the Michigan Limestone and Chemical Co., Rogers City, Mich., the largest quarrying operation in the world, in charge of design and construction. Mr. Wilson also assisted in the operation, having to do with the maintenance of trackwork, trestles, buildings, conveyors, crushing and screening equipment, storage systems, harbor work, dock and breakwater, etc.

In 1916 Mr. Wilson returned to the Solvay Process Co., Syracuse, N. Y., to take charge of civil engineering work at all of the various plants of the company, including several quarry operations. This work included examinations and reports on proposed extensions, such as water supplies, increased stone resources, revision of track systems, etc.

Since March, 1925, Mr. Wilson has been largely occupied in the sand and gravel industry as engineer for the Huron Sand and Gravel Co., Sarnia, Ont., having charge of the construction and operation of the gravel plant, breakwater, hydraulic dredge, etc. Subsequently he was engineer for the Superior Sand and Gravel Co., Detroit, Mich., for making investigations and reports on proposed extensions and improvements.

State Cement Plant Receives Large Order

ACCORDING to Manager Hartley of the South Dakota state cement plant, orders for 1926 delivery for 130,003 bbl. of Dacotah portland cement have been received. This amount is over one-third of the total business obtained in 1925. Figures for 1925 show 336,000 bbl. to have been shipped. Bags shipped out during the summer now are returning in large quantities, two carloads being received in one day.—*Sioux City (Iowa) Journal.*

Phoenix Portland Cement Corporation Formed to Build Cement Plant in Alabama

LINDLEY C. MORTON, president of the Phoenix Portland Cement Co., operating a plant at Nazabeth, Penn., has sent us the information given below on the new cement plant to be built at Birmingham, Ala.:

A new company has been organized, named the Phoenix Portland Cement Corp., for the purpose of constructing a new portland cement plant 5½ miles west of Birmingham at Powderly, Ala. A group of a number of leading business men in Birmingham is associated with this new enterprise.

The company has acquired 140 acres of land lying between the Southern railway and the Atlantic, Birmingham and Atlantic railway, just west of Powderly Station. The location of the plant will make possible an adequate supply of cheap fuel, power, labor and raw materials. All of the 140 acres is underlaid with a very fine deposit of high grade limestone, excellently suited for the manufacture of the highest quality of portland cement. The property has been diamond drilled and exhaustive tests by our engineers and chemists show that there is sufficient raw material at the plant site to operate the plant at full capacity for 120 years.

The plant will have an initial capacity of 1,300,000 bbl. annually, but it is designed to increase this capacity as rapidly as market conditions warrant it. Our engineers first made a careful study of all of the latest American cement plants and then spent some time in Europe last fall studying the latest European cement mill practice, with the result that we have designed a plant in which we have embodied the best features of the American practice, combined with the best features of the European practice. The plant will be materially different from the existing American cement plants, and will contain many unusual features designed to effect economies in labor, power and fuel and to produce an unusually high quality of cement. The wet process will be used, and the manufacturing units will be the largest ever installed in this country. The two rotary kilns will be the largest in the world, as they will be 11 ft. 3 in. in diameter and 330 ft. long. The grinding mills, which will be 7 ft. in diameter and 40 ft. long, will be the largest in the United States.

The plant buildings will all be of reinforced concrete and steel and are designed to be architecturally attractive, as well as substantial. It is our desire to make this one of the most attractive industrial plants in the south, and much thought has been given to this phase of it. Among other unique features, the plant is designed to be absolutely dustless by using the latest American and European methods of dust collection and prevention.

The plant will be built by our own organization under the direction of R. J. Hawn, chief engineer. Work on the new plant has been started and the plant will be completed approximately January 1, 1927.

The officers of the company are as follows: Lindley C. Morton, president; E. P. Haubert, secretary and treasurer; S. C. McCurdy, sales manager; R. J. Hawn, chief engineer; R. E. Roscoe, supervising chemist.

Oregon Portland Holds Annual Elections

DIRECTORS and officers of the Oregon Portland Cement Co., Portland, Ore., operating a plant at Oswego, Ore., were re-elected at a recent stockholders' meeting. Carl W. Gath, secretary and treasurer, was elected a director in place of Franklin I. Fuller, deceased. R. P. Butchart of Victoria, B. C., was re-elected president; L. C. Newlands, vice-president and manager, and C. V. Dolph, attorney in fact and agent. In addition, the re-elected directors are M. J. Ballard of Salt Lake City and A. S. Pattullo, George Lawrence, A. H. Devers and Edward Cookingham, all of Portland.

The report of General Manager Newlands for the year to close of November showed that in the 11 months of that period 419,612 bbl. of cement had been produced. At the year's opening 72,000 bbl. were on hand and at the close, 46,000 bbl.

New methods of operating the Roseburg limerock quarry effected a saving of 37% in this item, the manager reported.

The new quarry at Dallas was reported to be producing satisfactorily. Shutdowns at the Oswego mill last year amounted to less than 12 hours' suspension.

The company paid regular dividends last year on the 7% preferred stock, reducing the amount outstanding another 10%. Three per cent dividends on the common stock were paid.—*Portland (Ore.) Telegraph.*

Virginia Portland Makes First Cement Shipments

THE first carload of cement was shipped recently from the plant of the Virginia Portland Cement Corp. in South Norfolk, Va., formally inaugurating the operations of this newest plant of the International Cement Corp. system. The output of the plant will add about 1,200,000 bbl. to the International yearly productions.

The first car was shipped over the Atlantic Coast Line railroad to a North Carolina point. The shipment of the first car was the occasion of a celebration at the plant, the sides of the car being covered with large banners announcing that it was carrying the initial output of the Norfolk factory.

While the cement plant actually has been in operation for a short time the shipments of its products did not get under way until recently, the factory having run up to this time largely for the purpose of getting its machinery and organization into efficient working order, and to store up a certain surplus of cement for emergency orders.

"The factory now is ready to make regular shipments of the Norfolk cement to its trade in Virginia and the Carolinas," Dwight Morgan, sales manager, announced when the first car moved out of the plant. "The officials of the company are quite pleased with the beginning of shipments and are looking forward with optimism to the prospects for a successful business year.

The plant is under the management of H. E. Hilts, who was formerly an executive of the Portland Cement Association.

First shipment of cement from the Virginia plant of the International Cement Corp.

Building Material Outlook Is Good in East

BUSINESS has entered on the new year with an enthusiasm born of confidence in the soundness of conditions, says the January 21 *Trade Review* of Tomkins Brothers, wholesale building material dealers of Newark and Philadelphia. The year just closed proved to be one of the most satisfactory for all industries in many years. The outstanding features were price stability and a balance between production and consumption, with prompt delivery of goods. The present year promises to be as satisfactory in every way as 1925. The total value of building operations for last year is variously reported in the neighborhood of $6,000,000,000 and predictions from many seemingly reliable sources indicate that this year's building program will be as large.

Those who ignore the theory of evolution biologically must certainly admit that evolution in business practice is self evident. Rapid strides have been made within the last few years toward bringing about more satisfactory relations between producer and consumer. Principal among improved business practices is that of balancing production with demand. Until recent years it was the practice among manufacturers in most industries to produce all the goods that they could sell at any price regardless of the potential market. But, thanks to inspiration and encouragement from Washington, the old order has changed. It is now the business of trade associations to study their markets so that manufacturers can balance their output with the demand. The beneficial effect of this practice is seen in our own industry where manufacturers of portland cement, lime, clay goods and metal products can gauge their markets in advance and are therefore in a better position to render prompt service. This closer co-operation among manufacturers is the result of the decision by the Supreme Court in the Trade Association cases, that business men have a right to exchange information that will enable them to conduct their business intelligently.

Building Program Looms Large

Developments and still more developments—in Florida, Texas, Maine, Long Island, northern New Jersey and in the suburbs of nearly all large cities. It does not appear that the building wave is preparing to subside right away. The number of projects being brought to light is greater than at this time a year ago. Now that the demand for houses is fairly well supplied, the larger projects are more numerous. A heavy road building program exists in many states, contracts for schools and other public buildings are more frequent. With the return to normal conditions the federal government is also getting ready to start its long deferred building program which was postponed after the war so as to divert labor to housing. A nation-wide construction program for federal buildings which will cost more than $100,000,000 is being considered. It is said that President Coolidge favors legislation by the present Congress for this purpose. Members of Congress will doubtless welcome this construction policy because there were pending at the close of the last session more than a thousand bills for government buildings or sites totaling in value more than $200,000,000. One reason for the government's decision to go ahead as early as possible with this program is because of the high rents being paid for buildings now occupied for the conduct of federal business in various parts of the country.

Another prosperous year appears to be ahead for the cement industry, with a big road building program, several large hydro-electric developments and other large construction jobs. No great increase over 1925 is predicted, although a good steady demand throughout the year is practically assured. There is nothing in the present situation to indicate a change in the price of cement either up or down from the present level.

Production of portland cement for the whole country during 1925 was 161,298,000 bbl., representing an increase of nearly 8½% over 1924. Shipments last year were 156,721,000 bbl., an increase of 7½% over the preceding year.

The gypsum industry has had its share of the prosperity that has prevailed in the construction industry during the last year. The gypsum market has stabilized considerably from the uncertain conditions that existed for several years after the war. Prices are steady and they will very likely remain at approximately their present level for some time.

Work to Start Immediately on Lehigh Portland's Florida Plant

WORK will begin immediately on the erection of the Lehigh Portland Cement Co.'s plant, which is to be constructed at a cost of $3,000,000 four miles north of Ocala, Fla.

F. C. Fisk, industrial engineer of the Lehigh company, arrived in Ocala a short time ago in the interest of furthering operations toward the plant's construction. He made known recently that engineers are working and staking off locations for the plant, railways, shops and other buildings, according to the blueprints which were made sometime ago.

The main plant will cover an area of 18 acres of ground, while the tracks, pits, cooling ponds and other auxiliary working parts will take in an area of 40 acres.

Near Burbank the Lehigh company has acquired some 620 acres of mineral clay lands.

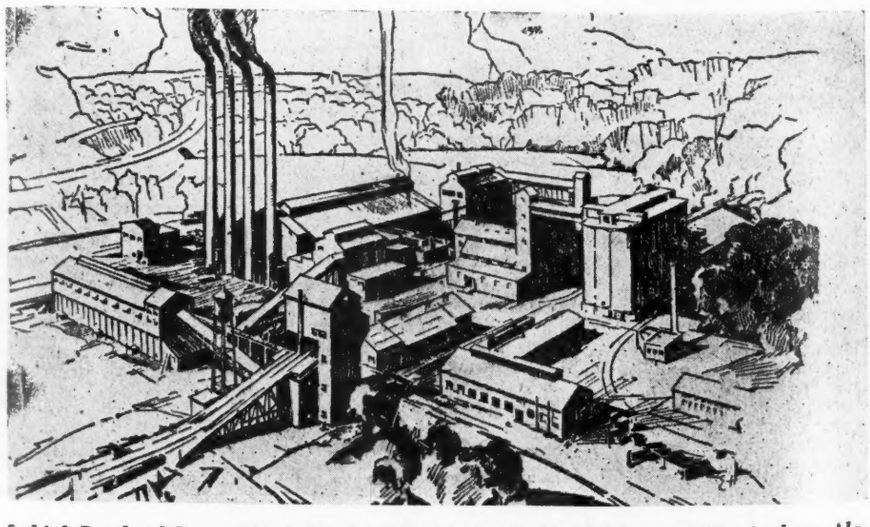
The new plant will have access to both the Seaboard and the Coast Line railroads and the Seaboard Air Line Railway Co. will extend a track connecting the plant with the clay pits near Burbank, a distance of eight miles, and connect up with the main line.

Mr. Fisk gave a brief description of the plant, stating that it will consist of silo storage with a capacity of 200,000 bbl., grinding machinery, boilers, buildings of all descriptions, conveyors, narrow-gage railways and elevators, in addition to the adjacent limestone quarries and cooling ponds. In design it is an exact duplicate of the Lehigh plant at Birmingham, Ala.

All buildings will be of steel and concrete. The wet process of manufacture will be used and dust collecting systems installed throughout.

In connection with the mills there will be built machine shops, blacksmith shops, carpenter and electric shops and other buildings. Storehouses carrying a stock of $150,000 in mill supplies and accessories will also be included.

From 900 to 1000 men will be employed in the construction period of the plant, and a crew of from 300 to 400 men will be maintained for its operation. Commissaries will be built for supplies and commodities.—*Ocala (Fla.) Evening Star.*



Lehigh Portland Cement Co.'s Florida plant to be duplicate of one at Birmingham, Ala.

Slate Producers Hold Annual Conference

THE fourth annual conference of the National Slate Association was recently held at the Hotel Commodore, New York. There were present slate manufacturers or their representatives from all the slate producing districts in the country. According to all reports, the 1925 convention was the most successful the association has ever had. The business sessions were interesting and educational and provided material of great value for the members in their future policy of marketing and manufacturing slate products.

The convention followed the program published in ROCK PRODUCTS, December 26 issue. The convention was opened by N. M. Male, president, who gave an excellent report on the year's progress. He laid particular stress on the danger which the roofing slate business was facing. He said:

A study of figures show, while the decrease in the sale of roofing slate is alarming, the sale of slate blackboards and structural slate have not only held their own but show an increase almost proportionately to that of building activities. The intense selling effort of the Natural Slate Blackboard Co. and the Structural Slate Co. has helped to bring this about. Had the same disorganized and little effort been made for blackboard and structural slate as for roofing slate, I am sure the story would have been the same, if not worse.

I ask that each operator make a careful study of "Slate in 1924," a bulletin recently issued by the Bureau of Mines, and note now, during the last decade, while the building budget of the United States has increased from $3,000,000,000 to $6,000,000,000 of building, our production has fallen from 1,019,553 squares of roofing slate in the year 1924 to 469,393 squares in 1924 and to the estimated total of 477,000 squares in 1925.

Our industry is drifting through indifference and unless something is done at once, it will only be a matter of another decade before we, like other unprogressive industries, will be relegated to the "junk heap."

He stressed the great need for co-operation among producers and the need for further educating the consumer on the advantages of slate for various uses. When this would be done, he continued, there would be no difficulty in selling all the slate products that a company could produce. To drive home his argument he gave Secretary of Commerce Hoover's recent statement to a group of business men which was to the effect that isolated units in any industry could no longer hold their own with the multitude of business forces because of the complex economical structure of the country. The slate industry would get only what it deserved; if operators cared only about their individual operations, then in time the whole industry and they themselves would suffer by it and the eventual decline approach rapidly. Proper co-operation would set that date into the far-off future.

In reviewing the past year he said:

The year 1925 has been a very busy one in spite of our reduced income. It saw the following accomplishments:

Three real directors' meetings — and definite directing of activities.

Two splendid summer outings.

Six issues of the *Slate News Bulletin.*

The 1925 conferences.

Completion of "Slate Roofs" book, compiled after three years of exhaustive research and effort on basic facts on this most important branch of the industry.

Distribution of 20,000 "Slate Floors and Walks" folders.

Arrangements were made for partial payment plan for owners desiring to re-roof with slate.

Distribution of 12,000 re-roofing circulars to architects and roofers.

Progress and support in certain localities for anti-shingle ordinances.

Slate roof sales are better in towns having such ordinances or building codes or where they are building permanent homes.

Greater knowledge of our product and its qualities through research and tests.

Membership achieved in Producers' Research Council of American Institute of Architects.

Large traffic adjustments are delayed owing to great cases before I. C. C. and the railroads.

The Brayco lecture films were also completed.

As much field work as could be done on limited funds available helped keep slate interests protected where absolutely required.

From a legislative point of view we made the industry felt before Congress, government departments and other organizations and individuals in numerous ways during 1925.

During 1925 the association was officially represented at 17 conventions and gatherings of users or specifiers of slate. Exhibits were arranged at the annual architects' convention, the chemical show and the roofers, and tile and mantle contractors' conventions. We co-operated with the U. S. Bureau of Standards on fire and other tests of slate.

Slate movies are being distributed.

In addition to this a start has been made on a third book devoted to "Structural Uses and Other Possibilities in Use of Slate," which is expected to be completed within a short time.

He concluded by saying that while $100,000 had been spent by the association since 1922, this was small compared with the amount competitors spent in the same period. Further, if the association had spent over $30,000 per year since 1914 instead of 1922, the loss of roofing slate sales would not have been so great from 1914 to 1921.

At the regular annual elections the following were elected officers and directors for 1926:

President, N. M. Male, Pen Argyl, Penn.; vice-president, F. C. Sheldon, Granville, N. Y.; secretary, W. S. Hays, Philadelphia, Penn.; treasurer, A. H. Morrow, West Pawlet, Vt.

Canada, William Wright; Maine, G. F. Barnard; New York, E. R. Norton; Vermont, G. H. Shinville; Vermont, Stephen E. Fitzgibbon; Bangor, William H. Smith; Pen Argyl, Renton Brown; Slatington, James Owens; Chapman, R. D. Chapman; Peach Bottom, Charles A. Long; Virginia, P. C. Stanwood; Western, C. A. Lowry. Vermont director-at-large, James O'Brien; Pennsylvania director-at-large, W. S. Ditchett.

Slate in 1925

THE value of slate sold at the quarries in 1925 was $12,785,000, according to the estimates furnished by producers to the Bureau of Mines, Department of Commerce. This was 9% more than the value reported for 1924. Slate reported sold for roofing, blackboards, and granules and flour showed increase in both quality and value, while the other products decreased.

The roofing slate sold amounted to 477,000 squares, valued at $4,900,000, an increase of 2% in quantity and 6% in value. There was an increase of 41 cents in the average value per square.

The total sales of mill stock amounted to 10,405,000 sq. ft., valued at $4,110,000, an increase of 4% in quantity and 5% in value. Sales of mill stock for blackboards was the only variety of mill product that showed increased sales—23% in quantity and 39% in value. The estimated output was 5,000,000 sq. ft., valued at $1,596,000.

Sales of structural slate—2,276,000 sq. ft., valued at $880,000—decreased 3% in quantity. Sales of electrical slate, estimated at 1,654,000 sq. ft., valued at $1,355,000, decreased 8% in quantity.

In 1925 as in 1924 strikes in some of the quarries in the Pennsylvania district had the effect of curtailing the output of roofing slate and all classes of mill stock. There were also strikes in the quarries of the New York-Vermont district. The general demand for roofing slate was as good or better than in 1924 during the first part of the year, and prices were reported higher in 1925. The demand for structural and electrical slate increased toward the latter part of the year. The demand for blackboard material was exceptionally good until about October when it slowed down considerably.

The sales of crushed slate for roofing granules and flour in 1925 was estimated at 540,000 short tons, valued at $3,685,000, an increase of 5% in quantity. The average value per ton was somewhat higher than in 1924.

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning February 17:

Central Freight Association Docket

12384. Crushed stone and screenings. Carloads, Hillsville, Shaw Junction and Walford, Penn., to Pennsboro, W. Va. Present rates, $3 per net ton; proposed, $2.30 per 2000 lb.

12387. Crushed stone and screenings. Carloads, Hillsville, Shaw Junction and Walford, Penn., to Cameron, W. Va. Present rate, 21½ cents; proposed, $1.80 per 2000 lb.

12389. Crushed stone and crushed stone screenings. Carloads. Present rates, sixth class. Proposed rates (in cents per ton of 2000 lb): Proposed rate to Rivare, 75 cents; Decatur, Preble, Magley, Tocsin, Uniondale, Markle, Simpson, 70 cents; Huntington, Clear Creek, 75 cents; Bippus, Servia, 80 cents; Bolivar, Newton, Laketon, Disko, 85 cents; Akron, 90 cents; Athens, 95 cents; Rochester, Germany, Leiters, DeLong, $1; Monterey, Ora, Bass Lake Junction, $1.05; Aldine, No. Judson, $1.10.

12397. Agricultural limestone, in bulk, in open top equipment. Carloads, France Quarries, Ohio, to Champaign, Mattoon and Robinson, Ill. Present rate, 22½ cents to Champaign and 23 cents to Mattoon and Robinson, Ill.; proposed, $1.40 per net ton.

12403. Crushed stone. Carloads, Greencastle, Ind., to Livingston and Litchfield, Ill. Present rate, $1.14 per net ton to Litchfield, Ill., and $1.26 per net ton to Livingston, Ill.; proposed, $1.01 per net ton.

12405. Ground limestone in bags loaded in box car equipment. Carloads, Chicago, Ill., to Terre Haute and Sullivan, Ind.

To	Per net ton. Proposed	Per 100 lb. Present
Terre Haute, Ind.	$1.60	15½
Sullivan, Ind.	1.70	16½

12456. Gravel and sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica). Carloads, Gravel Ban, I., to Parkersburg, W. Va. Present rate, 80 cents per net ton; proposed, 70 cents per net ton.

12461. Crushed stone and screenings. Carloads, Shaw Junction, Hillsville and Walford, Penn., to Cleveland and Akron, Ohio. Present rate, $1.05 per 2000 lb.; proposed, 90 cents per 2000 lb.

12463. Crushed stone. Carloads, McVittys, Ohio, to Harrison, Ohio. Present rate, 19½ cents; proposed, $1.20 per net ton.

12466. Sand (blast, engine, foundry, glass, loam, molding or silica). Carloads, Hendlein, Penn., to Murrayville, Penn., (b) sand (other than blast, engine, foundry, glass, loam, molding or silica), carloads, Henlein, Penn., to Murraysville, Penn. Present rate, 18½ cents; proposed (a), $1.76 per 2000 lb.; (b), $1.60 per 2000 lb.

12486. Crushed stone. Carloads, White Sulphur, Ohio, to Limeville, Ky. Present rate, 18½ cents; proposed, $1.40 per net ton.

New England Freight Association Docket

9627. Granite. Carloads, rough quarried or chiseled, hammered or sawed (not sand rubbed, carved, lettered, polished or traced) and granite paving or granite curbing, minimum weight 50,000 lb., from Barre, Montpelier and Bethel, Vt., to Philadelphia, 25 cents. Reason—This rate is necessary to be on the same basis as the Boston and Maine R. R.

9638. Crude feldspar. Minimum weight 60,000 lb., from Keene, N. H., to Topsham and Littlefield, Maine, 16 cents. Reason—To provide a proportional rate on feldspar shipped from the mines at Keene, N. H., to the grinding plants at Tipsham and Littlefield, Maine, the product to be reshipped via the rail carriers.

Western Trunk Line Docket

5119. Stone, crushed. Carloads, from Felch, Mich., to Lowell, Ind. Present, $4.80 per net ton based in Chicago; proposed, $3.33 per ton.

5129. Sand. Carloads, from Greenville and Mulberry Grove, Ill., to Council Bluffs, Iowa, Nebraska City, Omaha and South Omaha, Neb. Present, $3.70 per net ton (18½ cents per 100 lb). Class E. Proposed, $3.10 per net ton. Minimum weight 90% of the marked capacity of car, except when loaded to full visible capacity, actual weight will apply but not less than 40,000 lb.

5132. Stone, crushed. Carloads, from Hollister, Kan., to stations in Missouri on the K.C.S., Mo. Pac., St. L.-S. F. and C. R. I. & P. Rys. Present, combination of locals; proposed, Missouri intrastate joint distance scale as per W. T. L. Tariff 91E. Minimum weight 90% of marked capacity of car, except that when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity of car, the actual weight will apply. In no case shall the minimum weight be less than 40,000 lb.

Southern Freight Association Docket

24944. Rough marble. Carloads. It is proposed to establish commodity rates on rough marble, carloads, as described in Note 41 of Agent Glenn's I. C. C. A457, from Marietta, Ga., to various Carolina and Virginia points, to be the same as at present in effect from Ball Ground, Canton, Jasper, Nelson and Tate, Ga., to those points. The proposed rates to apply in lieu of present fifth class rates. Statement showing the proposed rates to destinations involved will be furnished upon request.

24956. Marble or granite, dressed, viz.: Blocks or slabs, dressed, hammered, chiseled or polished, boxed, crated or so braced in the car to prevent shifting of load and insure safe transportation. Carloads, from Knoxville, Tenn., Boyd, Concord, Powder Springs, Caswell, Ebenezer, Luttrell, Tenn., and L. & N. R. R. stations, Louisville to Greenback, Tenn., inclusive, to Lynchburg, Newport News, Norfolk, Petersburg, Port Norfolk, Portsmouth and Roanoke, Va. Present rate, 37½ cents per 100 lb., except Southern Ry., publishes rate of 84½ cents per 100 lb. from Knoxville, Tenn.; proposed rate, 49½ cents per 100 lb., which compares favorably with present rate of 59 cents per 100 lb. from Tate, Ga.

24966. Sand. Carloads, as described in Agent Speiden's I. C. C. 868, from Paducah, Ky., to Dyersburg, Tenn. Present rate. $1 per net ton, same as rate in effect from Memphis, Tenn.

24900. Marble, rough quarried. Carloads, minimum weight 40,000 lb., from Marmor, Tenn., to Buffalo, N. Y., and Pittsburgh, Penn. Combination rates now apply. Proposed, $5.90 per net ton, same as published rate from Knoxville and Pinkmar, Tenn.

25079. Slag. Carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern from Birmingham, North Birmingham, Bessemer, Ensley, Thomas, Woodward, Alabama City, Gasden and Anniston, Ala., to points named below. In lieu of combination rates, it is proposed to establish the following rates: To Canton and Keithsburg, Ga., $1.78; Gorber Ball Ground, Nelson, Tate and Jasper, Ga., $1.88 per net ton. The rates proposed are made on the same basis as observed between other points on the L. & N. R. R. for similar distances, except that there has been added to such single line basis the difference reflected in the single and joint line scales for similar distances that were submitted to the Alabama-Georgia Commission.

25116. Sand and gravel. It is proposed to establish through rates on sand and gravel, usual description and minimum weight, from Estill Springs and Sewanee, Tenn., to local stations on the Southern Railway on basis of Georgia proposed scale, less 10%, in lieu of present combination rates.

25148. Chert and furnace slag. It is proposed to cancel the present commodity rate on chert, carloads, from Bessemer, Ala., to Mobile, Ala., and furnace slag, carloads, from Trussville, Ala., to Mobile, Ala., account of no movement. Class rates to apply after cancellation.

25188. Sand and gravel. Carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity, actual weight will govern from Bainbridge, Ga., to Lake City, Fla. Present rate, subject to minimum weight of 30,000 lb., $2.53 per net ton (combination); proposed, $1.49 per net ton, based on the proposed Georgia-Alabama single line scale reduced 10%.

25224. Gravel. Carloads, minimum weight 90% of marked capacity of car used, except when cars are loaded to their visible capacity, actual weight will govern, from Montgomery, Ala., to McKenzie, Ala. Present rate, $1.20; proposed, $1.04 per net ton (intrastate only), same as rate in effect to River Falls, Ala.

Illinois Freight Association Docket

3485. Sand, all kinds, except blast, also foundry, glass, molding or silica, also gravel. Carloads, minimum weight capacity of car from Forreston, Ill., to Sullivan, Ill. Rates in cents per net ton: Present, 126; proposed, 114.

3490. Sand, all kinds, except blast, engine, foundry, glass, molding or silica, also gravel. Carloads, minimum weight capacity of car from Lincoln, Ill., to Kankakee, Ill. Rates in cents per net ton: Present, 113; proposed, 101.

1624B. Crushed stone. Carloads, minimum weight 90% of marked capacity of car, except when weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity, the actual weight will apply, but in no case shall the minimum weight be less than 50,000 lb., from Buffalo and Linwood, Iowa, to Milwaukee, Wis. Rates in cents per net ton: Present, 190; proposed, 160.

2887A. Stone, crushed. Carloads, as described in I. C. R. R. Tariff 13321F, from Kankakee, Ill., Lehigh, Ill., to McLeansboro, Ill., Delafield, Ill. Present, $1.55; proposed, class rates. From Thornton, Ill., to Dahlgren, Ill. Present, $1.68; proposed, class rates.

3502. Crushed stone. Carloads, minimum weight 90% of marked capacity of car, from Thornton, Ill., to Paducah, Ky. Rates in cents per net ton. Present, 201; proposed, 211.

3506. Sand, blast, engine, foundry, molding. Carloads, from Chicago, Ill., to Freeport, Ill. Rates in cents per net ton. Present, 100 via one line; 110 via another line. Proposed to establish uniform rate.

Trunk Line Association Docket

13003. To establish rate on sand other than blast, engine, glass, molding, silica or foundry and gravel. Carloads, from Scale Siding, Tannery and White Haven, Penn., to Kingston, Penn., D. L. & W. R. R. Delivery $1.05 per net ton. Reason—Proposed rate compares favorably with others in the same general territory.

13007. To cancel from P. R. R. Tariff G. O. I. C. C. 14153 rate of 60 cents per net ton on crushed stone, carloads, and rate of 80 cents per net ton on broken stone, carloads, from Fricks Lock and Pottstown Station, Penn., to Pennhurst, Penn. Classification basis to apply. Reason—It has been developed that there are to be no future movements on these rates, therefore same are obsolete. File 37373.

13010. To revise rates on slag, in bulk, carloads, from P. R. R. and Reading Company Stations, Bethlehem, Birdsboro, Reading, Swedeland, Emaus, Temple, Topten, Pottstown, Hellertown, Bechtelsville, Leesport, Lebanon, Donaghmore and Coatesville, Penn.

Missouri Rate Increase Suspended

SUSPENSION for 129 days of increases in rates on sand and gravel, scheduled to go into effect on virtually all railroads of Missouri February 1, was ordered recently by the Missouri public service commission.

The suspension was ordered pending an investigation by the commission.

The proposed increases would apply in connection with shipments over two or more lines of railroads, where one of those roads now has a special commodity rate lower than the general distance scale, it was explained.

Material effect on the large quantities of sand, gravel, chats and crushed rock used by the state highway department in the construction of the Missouri highway system would result from the proposed increased rate, according to the commission.—*Jefferson City (Mo.) News.*

Missouri Cement Rule

ANSWERING the petition of the director-general, for reargument or reconsideration, in 14543, H. C. Farrell vs. Chicago, Milwaukee & St. Paul, Director-General et al., H. W. Prickett and Milton H. Love, representing the complainant, said that the first premise of the director-general, that the Supreme Court, in the Sloss-Sheffield case, in effect, had overruled the commission in Missouri Portland Cement Co. vs. Director-General, 88 I. C. C. 492, was not a true statement of fact. They said the Supreme Court in this Closs-Sheffield case did not overrule the commission in any decision whatsoever. Contrarily, they said, it gave full concurrence to the opinion of the commission in the case before it. Continuing, they said:

No mention whatever was made by the court of the case which the director-general claims has been reversed. The opinions of the commission in this Sloss-Sheffield case and the Missouri Portland Cement case do not cover identical points; the opinions are neither concurring nor contrary or conflicting opinions. How, then, can it be truthfully said that the concurrence in one such opinion by the Supreme Court is in effect a reversal of the other?

In the Sloss-Sheffield case the commission awarded reparation to the consignors on shipments sold, with the freight charges as part of the invoice price. Consignees paid such charges in the first instance, receiving credit (to that extent) as payment of the invoice price of goods shipped. The Supreme Court has now upheld the commission in its decision.

In the Missouri Portland Cement case, the complainant was also the consignor, and freight charges were prepaid by it, though the goods were sold f.o.b. point of origin. By separate invoices complainants subsequently collected from the consignees the amount so prepaid. The commission awarded reparation to the consignor for at least two specific reasons: First, that, in paying freight charges on goods sold f.o.b. point of origin, the consignor was clearly acting as agent for the consignee, and the right of an agent to sue in his own name, when the principal is undisclosed and makes no objection is recognized; and, second, that the Supreme Court in the Darnell Taenzer case, 245 U. S. 531, has said that the "general tendency of the law, in regard to damages at least, is not to go beyond the first step"; therefore, it is not of controlling importance for complainants to suffer ultimate damage in the payment of excessive freight charges, in order to be entitled to receive reparation.

The commission's opinions, in these two cases, are not all conflicting; rather they are both drawn from the broad principle expounded by the Supreme Court in the Darnell Taenzer case, that when proximate damages are suffered it is not necessary to go beyond the first step.

If, on the other hand, we are to agree with defendants herein, in their plea for reconsideration, that the decision of the Supreme Court, in the Sloss-Sheffield case (which supports the commission's view in the same case) overrules the commission in the Missouri Portland Cement case, we must likewise accept as a fact that the commission has reversed itself in the Missouri Portland Cement case, which is a preposterous conclusion.—*Traffic World.*

Texas Cities Oppose Rate Increase

TEXAS municipalities, as the largest users of sand and gravel in Texas, had representatives before the Railroad Commission recently to object to any increase in the rates on those commodities as a result of the general hearing thereon which was to have started on January 13 but which was postponed to March 1. Municipalities are accorded a special rate on street materials and the scale proposed in the hearing would even further lower it as to sand and gravel, which would be acceptable to the towns and cities.

Sewall Myer, city attorney, and H. J. Painter, assistant city attorney of Houston, appeared for the municipalities to oppose any rate increases affecting street materials. The commission ordered postponement because insufficient time existed to hear the case at the date set.

The hearing was called by the commission as a result of numerous complaints of Texas sand, gravel and stone shippers that current rates are unequal and out of line.

It is proposed to arrange the rates on three classes as follows, one tariff on crushed stone, sand and gravel, another scale on rough stone and the third on dressed stone. The present hearing is to consider the rates on all of the commodities named and related articles, including monumental stone.

Practically every large dealer and producer of stone, sand and gravel in Texas was present, represented to urge a general revision downward and equalizing of the rates.

Traffic representatives of Chambers of Commerce were also here to aid in the effort while the railroads were reported in opposition to a reduction in their revenues.—*Dallas (Texas) News.*

Railroad Protests Crushed Stone Refund

ACCORDING to word received by E. N. Adams, secretary-manager of the Tulsa Traffic Bureau, the Frisco railroad has appealed to the state supreme court the recent decision of the corporation commission setting a rate of 2 cents per 100 lb. on rubble, or rough-broken building stone, shipped from the Hughes Stone Co. quarries at Garnett, Okla., to Tulsa for use in building the new First Methodist church. This means that the present rate of 3 cents will apply until the case is finally decided.

The Frisco contended that the 2-cent rate which is charged on crushed rock for the same haul does not apply to rough-broken building stone and charged 1 cent per 100 lb. more. Officials of the church, through the traffic bureau, took the matter up with the corporation commission and on November 19 that body handed down a decision that the crushed rock rate should be applied to shipments for the building of the church. It also ordered a refund of 1 cent per 100 lb. on shipments already made and collected for. It is from this decision that the present appeal is taken.—*Tulsa (Okla.) Tribune.*

Magnesite Stucco Is Stucco

A FINDING of unreasonableness, an award of reparation, and an order for the future have been made in No. 15904, Rocbond Co. vs. Atchison, Topeka & Santa Fe et al., mimeographed, as to rates on magnesite stucco, from Cedar Rapids, Iowa, to destinations in Nebraska, Colorado, Wyoming, Kansas, and southwestern Missouri. The commission, by division No. 3, found that magnesite stucco, composed of stucco mix, magnesium chloride, and crushed rock dash, shipped in separate packages in the same car, came within the general commodity description of stucco. It further found that rates on magnesite stucco as before described, the magnesium chloride not to exceed 20% and the crushed rock dash not to exceed 50% of the gross weight, have been, are and for the future will be unreasonable to the extent they exceeded, exceed, or may exceed the contemporaneous rates on stucco, as described in the tariffs (Boyd's and C. & N. W.) mentioned in the case, and that the complainant was entitled to reparation.

The commission said it was the practice of the complainant to sell, f.o.b. Cedar Rapids, advise the consignor of the rate to destination and reimburse him to the extent the rate charged exceeded the commodity rate on stucco quoted by the complainant. It held that in instances in which the complainant had paid the excess it was damaged and entitled to reparation.

In a letter to the examiner the defendants said, it had been decided not to defend the case, that conclusion having been reached by the Iowa lines. The commission said that in magnesite stucco in Western Trunk Line territory, 74 I. C. C. 567, in substance, it found that magnesite stucco came within the general commodity description of stucco and it so specifically found in this case.

Rates in accordance with the finding are to be established not later than February 25. —*Traffic World.*

Washington Cement Rates Under Protest

HEARING on the complaint of W. F. Jahn & Co. of Seattle, Wash., in contesting the rail rates on cement between Puget Sound cities and Grays Harbor points is to be held soon before the Washington Department of Public Works. It is contended that the present rate of 11½ cents is excessive and that a rate of 8 cents should apply. Railroads fighting the case are the Northern Pacific, Oregon-Washington Railroad & Navigation Co., and the Chicago, Milwaukee & St. Paul.—*Tacoma (Wash.) News-Tribune.*

New Machinery and Equipment

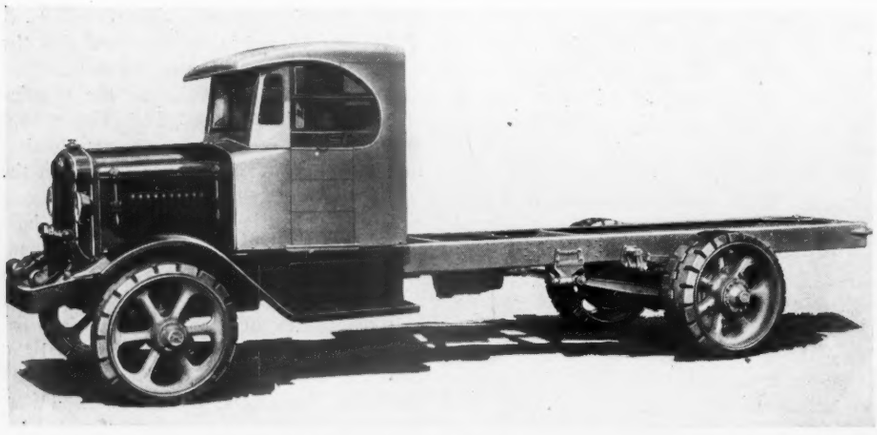
New Heavy Duty Motor Trucks

NEW heavy-duty trucks, especially designed to adequately care for the increasing hauling problems of industry are announced by the General Motors Truck Co., Detroit, Mich. Two of the models, the 5-ton and 3½-ton, have been named "Big Brute," as typifying their inherent strength. The third model, the 2½-ton, has been designed along lines said to produce fleetness combined with strength. All three models are said to contain new mechanical and engineering achievements.

Added power has been supplied in these new GMC trucks, new manufacturing methods have permitted even finer limits of accuracy and several new features of design have been added which are said to further increase the ease of performing necessary service operations. These are said to reduce upkeep cost and also shorten the time a truck is withdrawn from work.

An all-steel cab, designed by the Fisher Body Corp. in collaboration with General Motors engineers, is used as standard equipment on all GMC heavy duty trucks. This cab is rattle proof, has a one-piece full vision ventilating windshield, comfortable spring seats, and is equipped with sliding doors and sliding curtains providing complete protection against the worst weather.

Among the mechanical improvements are included a new metal used in the removable cylinder walls which is said to give greater hardness and wearing quality; double honing finish of the walls; lapped piston pins; new metal alloys for the valves, and a special "coining" finish which is said to improve their wear and reduces noise.



New five-ton heavy-duty motor truck

Service of Kiln Linings

AN interesting comparison of the service of first quality fire clay brick such as generally used heretofore and that of high alumina diaspore clay brick in the hot zones of cement kilns is disclosed by the accompanying views, which were taken in the plant of a large Eastern cement company, and supplied us by the General Refractories Co.

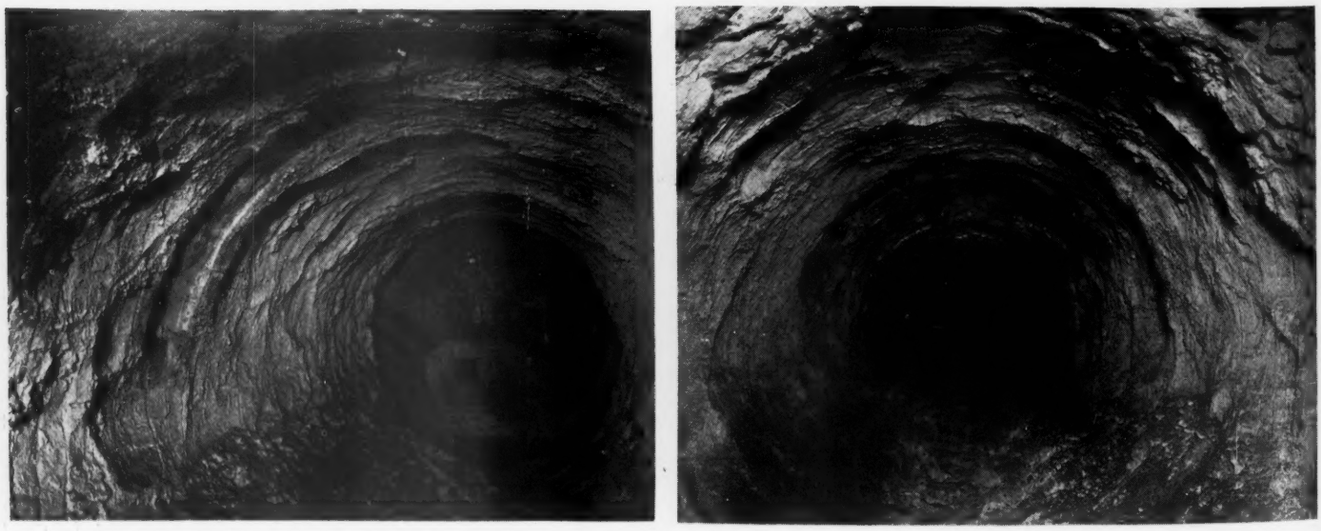
Kiln No. 5 (Figs. 1 and 2) was lined with high-grade fire clay brick on June 13, 1925, and shut down in the latter part of December, a period of about six months' operation. As can be clearly seen in the photographs, which were taken from the feed end and the discharge end, respectively, the kiln lining was badly scored and, in several places, worn away to the shell.

Kiln No. 6 (Figs. 3 and 4) was lined on June 10, 1925, with the same brand of fire clay brick. It, too, was badly scored and worn away, as shown by the photographs.

Kiln No. 1 (Figs. 5 and 6) was lined on April 24, 1925, and was in service for about eight months. The conditions of the fire clay brick lining is clearly shown in the photographs.

Kilns Nos. 2 and 3, which were lined with high-grade fire clay brick, were found to be in about the same general condition as those shown in the photographs. None of the five kilns was fit for further service.

In sharp contrast to the kilns lined with fire clay brick is the condition of Kiln No. 4 (Figs. 7 and 8). The hot zone of this kiln was lined with high alumina diaspore clay brick "Arcofrax" on January 1, 1925. It was in service more than 11 months—about twice as long as some of the other kilns—yet the high alumina brick is still in ex-



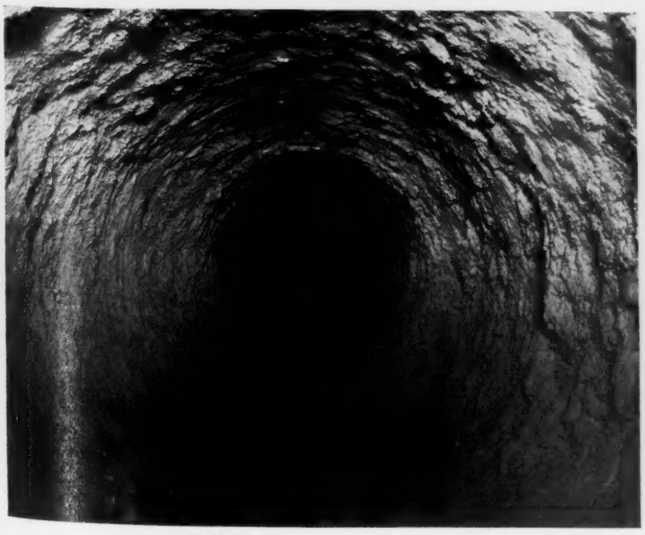
Figs. 1 and 2—Condition during last week in December of kiln No. 5, lined with firebrick on June 13, 1925

cellent condition, as the photographs show. This kiln was returned to service without relining and, judging from its appearance, the lining is good for some months of additional service, such as it has already had.

Kiln No. 4 was the first kiln in this plant to be lined with high alumina brick and its service will be closely followed and further studied. Apparently, however, the service of high alumina brick in this kiln and in another kiln under observation has been considered most encouraging.

Figs. 3 and 4—Condition during last week in December of kiln No. 6, lined with firebrick June 10, 1925

Figs. 5 and 6—Condition during last week of December of kiln No. 1, lined with firebrick April 24, 1925



Figs. 7 and 8—Condition during last week of December of kiln No. 4, lined with high alumina firebrick January 1, 1925

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F.O.B., at producing point or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Buffalo, N. Y.	1.15	1.30	1.30	1.30	1.30	1.30
Chaumont, N. Y.	.50		1.75	1.25	1.25	1.25
Chazy, N. Y.	.75	1.65	1.65	1.40	1.40	1.40
Cobleskill, N. Y.	1.50	1.35	1.25	1.25	1.25	
Eastern Pennsylvania	1.35	1.35	1.35	1.35	1.35	1.35
Frederick, Md.	.50	.75	1.30	1.20	1.10	1.10
Munns, N. Y.	1.00	1.50	1.50	1.50	1.25	
Northern New Jersey	1.60	1.50@1.80	1.30@2.00	1.40@1.60	1.40@1.60	
Prospect, N. Y.	1.00	1.40	1.40	1.30	1.30	
Walford, Penn.	.80	1.35h	1.35h	1.35h	1.35h	1.35h
Watertown, N. Y.	.50		1.75	1.50	1.50	1.50
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Afton, Mich.			.50			1.50
Alton, Ill.	1.85		1.85			
Bloomville, Middlepoint, Dunkirk Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio; Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.00	1.00	1.00
Buffalo and Linwood, Iowa	1.10		1.30	1.10	1.15	1.15
Chasco, Ill.	1.25					1.15
Columbia, Krause, Valmeyer, Ill.	1.00@1.50	1.20@1.25	1.20@1.25	1.20	1.20	1.50
			Flux all at 1.30			
Cypress, Ill.	1.15	1.15	1.15	1.15	1.05	1.00
Gary, Ill.	1.00	1.37½	1.37½	1.37½	1.37½	1.37½
Greencastle, Ind.	1.25	1.25	1.15	1.05	.95	.95
Lannon, Wis.	.80	1.10	1.10	.95	.95	.95
Milltown, Ind.		.75@ .90	.75@ .90	.85@ .90	.85@ .90	.85@ .90
Northern New Jersey	1.30		1.80	1.60	1.40	
River Rouge, Mich.	1.10	1.10	1.10	1.10	1.10	1.10
St. Vincent de Paul, Que.	.75	1.25	1.05	.95	.90	.90
Sheboygan, Wis.	1.10	1.10	1.10	1.10	1.10	
Toledo, Ohio	1.60	1.70	1.70	1.60	1.60	1.60
Stone City, Iowa	.75		1.10†	1.05	1.00	
Waukesha, Wis.	.90	.90	.90	.90	.90	.90
SOUTHERN:						
Allgood, Ala.			Crusher run, fines out, for flux, 1.00 per net ton			
Cartersville, Ga.		1.50@1.65	1.25@1.50	1.15	1.10	
Chico, Texas	1.00	1.40	1.35	1.25	1.20	1.15
El Paso, Tex.	.75	1.00	1.00	1.00	1.00	
Ft. Springs, W. Va.	.50	1.60	1.50	1.35	1.25	
Graystone, Ala.			Crusher run fluxing stone, 1.00 per net ton			
Henderson, N. C.			1.50		1.25	
New Braunfels, Texas	.50@ .60	1.00@1.20	1.00@1.20	.80@1.00	.75@ .90	.75@ .90
Olive Hill, Ky.	.50@1.00‡	1.00	1.00	1.00	1.00	1.00
Rocky Point, Va.	.50@1.00	1.40@1.60	1.30@1.40	1.15@1.35	1.10@1.20	1.00@1.05
WESTERN:						
Atkinson, Kans.	.25	2.00	2.00	2.00	2.00	1.60‖@1.90
Blue Springs & Wymore, Neb.	.25	1.45	1.45	1.35c	1.25d	1.20
Cape Girardeau, Mo.	1.25		1.25	1.25	1.00	
Kansas City, Mo.	1.00	1.80	1.80	1.80	1.80	1.80
Rock Hill, St. Louis county, Mo.	1.20	1.35	1.35	1.35	1.35	1.35

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.70	1.45	1.20	1.05	
Duluth, Minn.	.90	2.25	1.90	1.50	1.35	1.35
Dwight, Calif.	1.00	1.00	1.00	.90	.90	
Eastern Maryland	1.00	1.60	1.60	1.50	1.35	1.35
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.70	1.60	1.50	1.35	1.35
Knippa, Texas	2.50	2.00	1.55	1.45	1.25	1.25
New Haven, New Britain, Meriden & Wallingford, Conn.	.80	1.70	1.45	1.20	1.05	1.05
Northern New Jersey	1.60	2.00	1.80	1.40	1.40	
Oakland and El Cerritto, Cal.	1.00	1.00	1.00	.90	.90	
San Diego, Calif.	.65@ .75	1.70@1.90	1.50@1.70	1.30@1.50	1.20@1.40	
Sheboygan, Wis.	1.00	1.10	1.10	1.10	1.10	
Springfield, N. J.	1.80	2.25	2.25	1.80	1.80	1.80
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	1.10

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley, Montello and Red Granite, Wis.—Granite	1.80	1.70	1.50	1.40	1.40	
Coldwater, N. Y.—Dolomite			1.50 all sizes			
Columbia, S. C.—Granite			1.75		1.50	
Eastern Penn.—Quartzite	1.20	1.35	1.25	1.20	1.20	1.20
Havelock, Ontario		2.60	2.10	2.10		
Lithonia, Ga.	.75	1.75	1.60	1.40	1.35	1.25
Lohrville, Wis.—Granite	1.65	1.70	1.65	1.45	1.50	
Middlebrook, Mo.—Granite	3.00@3.50		2.00@2.25	2.00@2.25		1.25@2.00
Northern New Jersey (Basalt)	1.50	2.00	1.80	1.40	1.40	
Richmond, Calif.—Quartzite	.75		1.00	1.00	1.00	
Somerset, Pa. (sand-rock)	1.85@2.00a		1.35@1.50		1.00@1.50	
Toccoa, Ga. (granite)	1.50			1.25	1.25	1.25

*Cubic yd. †1 in. and less. ‡Two grades. ‖Rip rap per ton. (a) Sand. (b) to ¼ in. (c) 1 in., 1.40. (d) 2 in., 1.30. (e) Dust. (f) ¼ in. (h) less 10c discount. (i) 1 in., 1.40.

Agricultural Limestone

(Pulverized)

Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 90% thru 100 mesh	6.00
Asheville, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk	2.75
Belfast and Rockland, Me. (rail), Lincolnville, Me. (water), analysis $CaCO_3$ 90.04%; $MgCO_3$ 1.5%, 100% thru 14 mesh, bags	4.50
Bulk	3.00
Branchton and Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)	5.00
Cape Girardeau, Mo.—Analysis, 93% $CaCO_3$, 3.5% $MgCO_3$; pulverized; 50% thru 50 mesh	1.50
Cartersville, Ga.—Analysis 68% $CaCO_3$, 32% $MgCO_3$; pulverized	2.50
50% thru 50 mesh	2.00
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk	2.50
Chico, Tex.—⅛ in. down	1.50
200 mesh	10.00
Colton, Calif.—Analysis 90% $CaCO_3$, bulk	4.00
Cypress, Ill.—90% thru 100 mesh	1.35
Danbury, Conn., Rockdale and West Stockbridge, Mass.—Analysis, 90% $CaCO_3$, 5% $MgCO_3$; 50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk	3.25
Henderson, N. C. (paving dust)—80% thru 200 mesh, bags	4.25@ 4.75
Bulk	3.00@ 3.50
Analysis $CaCO_3$, 56%; $MgCO_3$, 42%; 65% thru 200 mesh, bags	3.95
Bulk	2.70
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$; 75% thru 100 mesh; sacked	5.00
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk	2.50
Knoxville, Tenn.—Analysis, 52% $CaCO_3$, 37% $MgCO_3$; 80% thru 100 mesh; bags, 3.95; bulk	2.70
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk	3.50
Marion, Va.—Analysis, 90% $CaCO_3$, pulverized, per ton	2.00
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 90% thru 100 mesh	3.90@ 4.50
Milltown, Ind.—Analysis, 94.50% $CaCO_3$, 33% thru 50 mesh, 40% thru 50 mesh; bulk	1.35@ 1.60
Olive Hill, Ky.—50% thru 50 mesh, 2.00; 90% thru 4 mesh	1.00
Piqua, Ohio—Total neutralizing power 95.3%; 99% thru 10, 60% thru 50; 50% thru 100	2.50@ 2.75
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.10; bulk	3.60
99% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Rocky Point, Va.—Analysis 99.5% $CaCO_3$, 0.25% $MgCO_3$; 50% thru 200 mesh; bags, 3.25@3.50; bulk	2.00@ 2.25
Toledo, Ohio, 30% through 50 mesh	2.25
Waukesha, Wis.—90% thru 100 mesh, 4.50; 50% thru 100 mesh	2.10
Watertown, N. Y.—Analysis, 96-99% $CaCO_3$; 50% thru 100 mesh; bags, 4.00; bulk	2.50

Agricultural Limestone

(Crushed)

Alton, Ill.—Analysis 99% $CaCO_3$, 0.3% $MgCO_3$; 50% thru 4 mesh	3.00
Atlas, Ky.—Analysis over 90% $CaCO_3$; 90% thru 4 mesh	1.00@ 2.00
Bedford, Ind.—Analysis, 98.5% $CaCO_3$, 0.5% $MgCO_3$; 90% thru 10 mesh	1.50
Bettendorf, Iowa—97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Blackwater, Mo.—Analysis, 99% $CaCO_3$; 90% thru 4 mesh	.75
Bridgeport and Chico, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 100% thru 10 mesh	1.75
50% thru 4 mesh	1.50
Chasco, Ill.—50% thru 100 mesh	1.20
Chico, Texas—50% thru 50 mesh; bulk	1.50

(Continued on next page)

Agricultural Limestone

Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh	.80
Columbia, Krause, Valmeyer, Ill.—Analysis, 90% $CaCO_3$; 90% thru 4 mesh	1.35
Cypress, Ill.—90% thru 50 mesh, 50% thru 100 mesh, 90% thru 50 mesh, 90% thru 4 mesh, 50% thru 4 mesh	1.35
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.50
Garnet, Okla.—All sizes	1.25
Gary, Ill.—Analysis, approx. 60% $CaCO_3$, 40% $MgCO_3$; 90% thru 4 mesh	.90
Kansas City, Mo.—50% thru 100 mesh	1.25
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$, 32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk	1.60
Mayville, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 50% thru 50 mesh	1.85@ 2.35
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 42% $CaCO_3$, 54% $MgCO_3$; meal, 25 to 45% thru 100 mesh	1.60
Milltown, Ind. — Analysis $CaCO_3$, 93.10%, 40% thru 50 mesh	1.35@ 1.60
Moline, Ill., and Bettendorf, Iowa—Analysis, 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Pixley, Mo.—Analysis, 96% $CaCO_3$; 50% thru 50 mesh	1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh	1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@ 1.40
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75
Tulsa, Okla.—Analysis $CaCO_3$, 86.15%, 1.25% $MgCO_3$, all sizes	1.25
Waukesha, Wis.—90% thru 4 mesh	1.65

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk	3.00
Piqua, Ohio, sacks, 4.50@5.00 bulk	3.00@ 3.50
Rocky Point, Va.—80% thru 200 mesh; bags	4.25@ 4.75
Waukesha, Wis.—90% thru 100 mesh, bulk	4.50

Glass Sand

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

Berkeley Springs, W. Va.—Glass sand	2.25
Cedarville and S. Vineland, N. J.—Damp	1.75
Dry	2.25
Cheshire, Mass.: 6.00 to 7.00 per ton; bbl.	2.50
Columbus, Ohio	1.25@ 1.50
Estill Springs and Sewanee, Tenn.	1.50
Franklin, Penn.	2.25
Gray Summit and Klondike, Mo.	2.00
Los Angeles, Calif.—Washed	5.00
Mapleton Depot, Penn.	2.00@ 2.25
Massillon, Ohio	3.00
Mineral Ridge and Ohlton, Ohio	2.50
Oceanside, Calif.	3.00
Ottawa, Ill. (Contracts)	1.00
Pittsburgh, Penn.—Dry	4.00
Damp	3.00
Red Wing, Minn.: Bank run	1.50
Ridgway, Penn.	2.00@ 2.25
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.25
San Francisco, Calif.	4.00@ 5.00
St. Louis, Mo.	2.00
Sewanee, Tenn.	1.50
Thayers, Penn.	2.50
Utica, Ill.	1.00@ 1.15
Zanesville, Ohio	2.50

Miscellaneous Sands

City or shipping point	Roofing sand	Traction
Beach City, Ohio	1.75	1.50
Columbus, Ohio		.30@ .90
Eau Claire, Wis.	4.25	.65@ 1.00
Estill Springs and Sewanee, Tenn.	1.35@ 1.50	1.35@ 1.50

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, F.O.B., producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica and Franklinville, N. Y.	.75	.75	.85	.75	.75	.75
Buffalo, N. Y.	1.10	.95			.85	
Erie, Pa.		1.00*		1.50*	1.75*	
Farmingdale, N. J.	.58	.48	.75	1.20	1.10	
Hartford, Conn.	.65*					
Leeds Junction, Me.		.50	1.75		1.35	1.25
Machias Jct., N. Y.		.75	.75		.75	.75
Montoursville, Pa.	1.35	1.00	.90	.85	.75	.75
Northern New Jersey	.50	.50	1.25	1.25	1.25	
Olean, N. Y.		.75	.75	.75	.75	.75
Shining Point, Penn.			1.00	1.00	1.00	1.00
Somerset, Pa.		1.85@2.00		1.35@1.50		
South Heights, Penn.	1.25	1.25	.85	.85	.85	.85
Washington, D. C.	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Algonquin and Beloit, Wis.	.50	.40	.60	.60	.60	.60
Attica, Ind.	.75	.75	.75	.75	.75	.75
Barton, Wis. (f)		.50		.75	.75	.75
Boston, Mass.‡	1.50	1.50	2.50		2.50	2.50
Chicago, Ill.	.70	.50	.50	.60	.60	.60
Columbus, Ohio		.70	.70	70	.70	
Des Moines, Iowa	.40	.40	1.50	1.50	1.50	1.50
Eau Claire, Wis.	.65	.50	1.00			.95
Elgin, Ill.		.20*	.50*	1.50*	1.50*	1.50*
Elkhart Lake, Wis.	.60	.50	.50	.60	.50	.40
Ferrysburg, Mich.		.50@ .80	.60@1.00	.60@1.00		.50@1.25
Ft. Dodge, Iowa	.85	.85	2.05	2.05	2.05	2.05
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Haven, Mich.		.40@ .80		.60@1.00		
Grand Rapids, Mich.	.50	.50	.90	.80	.80	.70
Hamilton, Ohio		1.00			1.00	
Hersey, Mich.		.50		.70	.70	.60
Humboldt, Iowa		.85	2.00	2.00	2.00	
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Mason City, Iowa	.45@ .55	.45@ .55	1.35@1.45	1.45@1.55	1.40@1.50	1.35@1.45
Mankato, Minn.		.50	1.35	.60e	1.35	1.35
Mattoon, Ill.	.75	.75	.75	.75	.75	.75
Milwaukee, Wis.		1.01	1.21	1.21	1.21	1.21
Moline, Ill.	.60@ .85	.60@ .85	1.00@1.20	1.00@1.20	1.00@1.20	1.00@1.20
Northern New Jersey	.70	.70			1.60	
Oregon City, Ore.		1.25	1.25	1.25	1.25	1.25
Palestine, Ill.	.75	.75	.75	.75	.75	.75
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
St. Louis, Mo.	1.18	1.45	1.65	1.45	1.65	1.45c
Terre Haute, Ind.	.75	.75	.75	.75	.75	.75
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.		.45	.60	.60	.65	.65
Winona, Minn.	.40	.40	1.50	1.25	1.10	1.00
Yorkville, Sheridan, Oregon, Moronts, Ill.		.40@ .70	.30@ .50	.50@ .60	.60	.60
Zanesville, Ohio	.70	.60	.50		.80	
SOUTHERN:						
Charleston, W. Va.		All sand, 1.40.		All gravel, 1.50.		
Chattanooga, Tenn.		1.45			1.20	1.20
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.00
Lindsay, Texas					.55	
Macon, Ga.	.50	.50		1.00	1.00	1.00
New Martinsville, W. Va.	1.00	.90@1.00	1.20			.80@ .90
Roseland, La.	.25	.20	1.50	.85	.75	.75
WESTERN:						
Kansas City, Mo.	.80	.70				
Los Angeles, Calif. (points all around) (d)	.60	.50	.85	.85	.85	.85
Los Angeles district (bunkers) †	1.50	1.40	1.85	1.85	1.85	1.85
Phoenix, Ariz.	1.25*	1.00*	2.50*	2.00*@2.25*	1.75*	1.50*
Pueblo, Colo.	1.10*	.90*		1.80*		1.60*
San Diego, Calif.	.65@ .75	.65@ .75	1.50@1.60	1.20@1.40		1.00@1.20
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*	1.50*	1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Algonquin and Beloit, Wis.			Dust to 3 in., .40			
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Chicago, Ill.	.95					
Des Moines, Iowa	.50					
Dudley, Ky. (crushed silica)	1.10	1.10		.90		
East Hartford, Conn.			Sand, .75*			
Elkhart Lake, Wis.	.50					
Ferrysburg, Mich.						.65@1.00
Gainesville, Texas		.95				.55
Grand Rapids, Mich.	.50	.50		.60		
Hamilton, Ohio					.70	
Hersey, Mich.				.50		
Indianapolis, Ind.			Mixed gravel for concrete work, at .65			
Lindsay, Texas	1.30					.55
Macon, Ga.	.40					
Mankato, Minn.			Pit run sand, .50			
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Ottawa, Oregon, Moronto and Yorkville, Ill.			Ave. .60 per ton all sizes			
Roseland, La.	.60					
St. Louis, Mo.			Mine run gravel, 1.55 per ton			
Shining Point, Penn.			Concrete sand, 1.10 ton			
Smithville, Texas	.50	.50	.50	.50	.50	.50
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.	.60	.60	.60	.60	.60	.60
York, Penn.	1.10	1.00				

(a) ¾ in. down. (b) River run. (c) 2½ in. and less.
*Cubic yd. †Include freight and bunkerage charges and truck haul. ‡Delivered on job.
(d) Less 10c per ton if paid E.O.M. 10 days. (e) pit run. (f) plus 15c winter loading charge.

Core and Foundry Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton f.o.b. producing plant.

City or shipping point	Molding, fine	Molding, coarse	Molding, brass	Core	Furnace lining	Sand blast	Stone sawing
Aetna, Ill.				.30@ .35			
Albany, N. Y.	2.75	2.75	2.75	1.00@2.75		1.25@4.00	
Arenzville, Ill.	1.50@1.75			1.00			
Beach City, Ohio	1.75@2.25	1.75@2.25		1.50@2.00	2.00@2.50		1.75
Columbus, Ohio	2.00@2.50	1.50@2.50	2.00@3.00	.20@ .30	2.50	3.50@4.50	1.50@2.00
Eau Claire, Wis.				1.00		3.00	
Elco, Ill.	Ground silica per ton in carloads—18.00@31.00						
Elnora, N. Y.			1.75				
Estill Springs and Sewanee, Tenn.	1.25			1.25		1.35@1.50	
Franklin, Penn.	2.00	2.00	2.00	2.00			
Gray Summit and Klondike, Mo.	1.75	1.75	2.00	2.00	1.00		.85@1.00
Joliet, Ill.	No. 2 molding sand; loam for luting and open hearth work—.65@.85						
Kasota, Minn.							1.00
Mapleton Depot, Penn.	2.00	2.00				2.00	
Massillon, Ohio	2.50	2.50		2.50	2.50		
Michigan City, Ind.				.15@ .30			
Mineral Ridge and Ohlton, Ohio	2.00*	1.75		2.00*	1.75	1.75*	
Montoursville, P'n.				1.25@1.40			
New Lexington, O.	2.50	2.25					
Ottawa, Ill.		.75@1.00†					
Red Wing, Minn.	1.25		1.25	1.50	1.50	3.50	1.50
Ridgeway, Penn.	1.50	1.50		2.00			
Round Top, Md.				1.60		2.25	
San Francisco, Calif.	3.50	4.75	3.50	3.50@5.00	3.50@4.50	3.50@5.00	
Tamalco, Ill.		1.50@1.75					
Tamms, Ill.	Ground silica per ton in carloads—20.00@31.00						
Thayers, Penn.	1.25	1.25		2.00			
Utica, Ill.	.75	.80		.80	.80		
Utica, Penn.	1.75	1.75		2.00			
Warwick, Ohio	1.75*@2.25	1.75*		1.75*@2.25			
Zanesville, Ohio	2.75@3.00	1.75@2.25	2.75				

*Damp. †Crude silica, not washed or dried.

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y., Emporium nd Dubois, Pa.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Pa.	2.50	1.00		1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio		1.45		1.45		1.45	
Jackson, Ohio		1.05		1.30	1.05		1.30
Toledo, Ohio	1.50	1.25	1.50	1.25	1.25	1.25	1.25
Youngst'n, O., dist.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.55		1.55	1.55	1.55	
Ensley and Alabama City, Ala.	2.05	.80	1.35	1.25	.90	.90	.80
Longdale, Roanoke, Ruessens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15
Woodward, Ala.		.80	.90@1.25	.90@1.25	.90@1.05	.90	.90

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.20
Buffalo, N. Y.				12.00				
Chazy, N. Y.	12.50	10.50	8.00	12.00	11.50	16.50	10.00	2.50₂
Lime Ridge, Penn.							5.00a	
West Stockbridge, Mass.	12.00	10.00	5.60					2.00t
Williamsport, Penn.			10.00				6.00	
York, Pa.		9.50	10.50	10.50			8.00	1.65i
CENTRAL:								
Afton, Mich.					8.50	1.61		
Carey, Ohio	12.50	8.50@9.50	9.50		9.50		9.00	
Cold Springs, Ohio (f)	12.50	10.00	9.00		9.00	11.00	9.00	
Delaware, Ohio	12.50	10.00	9.00	10.00			9.00	1.50
Frederick, Md.		10.00	9.50	10.00			7.50	1.45
Gibsonburg, Ohio (f)	12.50				9.00			
Huntington, Ind.		8.50	8.50		9.00	11.00	8.00	1.50c
Luckey, Ohio (f)	12.50							
Marblehead, Ohio		8.50	8.50				8.00	1.50c
Marion, Ohio		8.50	8.50				8.00	1.50c
Milltown, Ind.		9.00@10.00		10.00p			8.00₂	1.40n
Sheboygan, Wis.		11.50					9.50	
Tiffin, Ohio					9.00			
White Rock, Ohio	12.50				9.00	11.00		
Wisconsin points (f)		11.50					9.50	
Woodville, Ohio	12.50†	8.50†	8.50†	13.50†	9.00	11.00₁	9.00	1.50c
SOUTHERN:								
Allgood, Ala.	12.50	10.00			8.50		8.50	1.50
El Paso, Tex.							14.00	1.75
Graystone, Landmark and Wilmay, Ala.	12.50	10.00					8.50	1.50
Keystone, Ala.	12.00	10.00	10.50	10.00	9.00		8.50	1.50u
Knoxville, Tenn.	20.25	10.00@11.00	10.00	10.00			8.50	1.50
Ocala, Fla.		13.00						1.70
WESTERN:								
Calcite, Colo.							9.00‖	
Kirtland, N. M.							15.00	
New Braunfels, Texas	12.00	12.00	10.00	12.00			9.50	1.50
San Francisco, Calif.	21.00	21.00	12.50@15.00	21.00			14.50	1.90v
Tehachapi, Calif.			8.00				13.00z	2.20x
Seattle, Wash.	19.00	19.00	12.00	19.00	19.00		18.60	2.30

†50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) wood; (e) per 180-lb. barrel; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 180-lb. net barrel 1.65; 280-lb. net barrel, 2.65 (m) finishing lime, 3.00 common; (n) common lime; (o) high calcium; (p) to 11.00; (q) to 8.50; (r) to 1.50; (s) in 80-lb. burlap sacks; (t) to 3.00; (u) two 90-lb. bags; (v) oil burnt; wood burnt 2.25@2.50; (x) wood, steel 2.30; (z) to 15.00; (*) quoted f.o.b. New York; (‡) paper bags; (w) to 1.50 in two 90-lb. bags, wood bbl. 1.60; (‖) to 10.00; (1) 80-lb. paper bags; (2) to 3.00; (3) to 3.00.

Miscellaneous Sands

(Continued)

City or shipping point	Roofing sand	Traction
Gray Summit and Klondike, Mo.	2.00	1.75
Mapleton, Depot, Penn.		2.00
Massillon, Ohio		2.25
Mineral Ridge and Ohlton, Ohio	*1.75@ 2.00	*1.75
Montoursville, Penn.		1.35
Ottawa, Ill.	1.25@ 1.50	
Red Wing, Minn.		1.25
Round Top, Md.	2.25	1.75
San Francisco, Calif.	3.50@ 4.50	3.50@ 4.50
Thayers, Penn.		2.25
Warwick, Ohio		2.25

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point,

Baltimore, Md.:	
Crude talc (mine run)	3.00@ 4.00
Ground talc (20-50 mesh), bags	10.00
Cubes	55.00
Blanks (per lb.)	.08
Pencils and steel worker's crayons, per gross	.08 1.25
Chatsworth, Ga.:	
Crude Talc	4.50
Ground (20-50 mesh), bulk	6.50@ 8.50
Ground (150-200 mesh), bulk	8.00@10.00
Pencils and steel worker's crayons, per gross	1.50
Chester, Vt.:	
Ground talc (150-200 mesh), bulk	9.00@10.00
Including bags	10.00@11.00
Chicago and Joliet, Ill.:	
Ground (150-200 mesh), bags	30.00
Dalton, Ga.:	
Crude talc	5.00
Ground talc (150-200) bags	10.00
Pencils and steel workers' crayons, per gross	1.00@ 2.50
Emeryville, N. Y.:	
(Double air floated) including bags;	
325 mesh	14.75
200 mesh	13.75
Hailesboro, N. Y.:	
Ground white talc (double and triple air floated) including bags, 300-350 mesh	15.50@20.00
Henry, Va.:	
Crude (mine run)	3.50@ 4.50
Ground talc (150-200 mesh), bags	9.75@15.00
Joliet, Ill.:	
Ground talc (150-200) bags	12.00@30.00
Keeler, Calif.:	
Ground (200-300 mesh), bags	20.00@30.00
Natural Bridge, N. Y.:	
Ground talc (300-325 mesh), bags	13.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 68-72%	4.50@ 5.00
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.	5.00
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	7.00@ 8.00

Ground Rock

(2000 lbs.)

Centerville, Tenn.—B.P.L. 65%	7.00
Gordonsburg, Tenn.—B.P.L. 65-70%	4.00@ 4.50
Mt. Pleasant, Tenn.—B.P.L. 65%; bulk	7.25
Twomey, Tenn.—B.P.L. 65%	7.25@ 8.25

Florida Phosphate

(Raw Land Pebble)

(Per Ton.)

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	3.00
70% min. B.P.L., Basis 70%	3.55
72% min. B.P.L., Basis 72%	4.10
75/74% B.P.L., Basis 75%	4.85
77/76% B.P.L., Basis 77%	5.60

Fluorspar

Fluorspar, 85% and over calcium fluoride, not over 5% silica, per net ton, f.o.b. Illinois and Kentucky mines	16.00
No. 2 lump, per net ton	19.00
Fluorspar, foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Philadelphia, duty paid, per net ton	16.00
Fluorspar, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, per net ton, f.o.b. Illinois and Kentucky mines	32.50

Special Aggregates

Prices are per ton f.o.b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco-chips
Barton, Wis., f.o.b. cars		10.50
Brandon, Vt.—English pink and English cream	*11.00	*11.00
Buckingham, Que.—Buff stucco dash		‡12.00@14.00
Chicago, Ill. — Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		8.00@10.00
Easton, Penn.—Green	16.00@20.00	16.00@20.00
Haddam, Conn. — Felstone buff	15.00	15.00
Harrisonburg, Va.—Blk marble (crushed, in bags)	†12.50	†12.50
Ingomar, Ohio — Concrete facings and stucco dash		6.00@18.00
Middlebrook, Mo.—Red		20.00@25.00
Middlebury and Brandon, Vt.—Middlebury white‡	7.00@11.00	7.00@11.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Calif. — "Natrock" roofing grits		12.00@16.00
Tuckahoe, N. Y.		12.00
Villa Grove, Colo.		13.00
Wauwatosa, Wis.		16.00@45.00
Wellsville, Colo.—Colorado Travertine Stone	15.00	15.00

‡C.L.
*C.L. including bags; L.C.L. 14.50.
‡C.L. including bags.

Potash Feldspar

Auburn and Brunswick, Me.—Color, white; 98% thru 140 mesh bulk	19.00
Bath, Me.—Color, white; analysis, potash, 12%; 100% thru 180 mesh, bags, 21.00; bulk	18.00
Buckingham, Que.—Color, white; analysis, K_2O, 12-13%; Na_2O, 1.75%; bulk	9.00
De Kalb Jct., N. Y.—Color, white; bulk (crude)	9.00
East Hartford, Conn.—Color, white (60-80 mesh); bags	17.00@20.00
Finer grades	20.00@30.00
Erwin, Tenn.—Color, white; analysis, 12.07% K_2O, 19.34% Al_2O_3; Na_2O, 2.92%; SiO_2, 64.76%; Fe_2O_3, .36%; 98.50% thru 200 mesh, bags, 16.90; bulk	15.50
Glen Tay Station, Ont., color, red or punk; analysis: K_2O, 12.81%, crude, bulk	6.00@ 7.50
Los Angeles, Calif.—Color, white; analysis, K_2O, 10.35%; Na_2O, 3.62%; Al_2O_3, 18.71%; SiO_2, 65.48%; Fe_2O_3, .17%; 100% thru 150 mesh, bags, 24.00; bulk	22.00
Murphsboro, Ill.—Color, prime white; analysis K_2O, 12%; Na_2O, 2%; 65% SiO_2; crude, bags, 7.00; bulk	6.50
Pulverized; 98% thru 200 mesh, bags, 22.00; bulk	21.00
99% thru 100 mesh, bags, 21.00; bulk	20.00
100% thru 100 mesh; bags, 20.00; bulk	19.00
Penland, N. C.—Color, white; crude, bulk	8.00
Ground, bulk	16.50
Tenn. Mills—Color, white; analysis K_2O, 18%; Na_2O_3, 10%; 68% SiO_2; 99% thru 200 mesh; bulk	18.00
99% thru 140 mesh, bulk	16.00
Toronto, Can.—Color, flesh; analysis K_2O, 12.75%; Na_2O, 1.96%; crude	7.50@ 8.00
Trenton, N. J.—Crude, bulk	12.00@27.00
99% thru 140 mesh; bulk	16.00
(Bags 11 cents each, non-returnable)	
Wheeling, W. Va.—Color, white; analysis,, K_2O, 9.50%; Al_2O_3, 16.70%; Na_2O, 3.50%; SiO_2, 69.50%; 99% thru 140 mesh, bulk	19.00

Blended Feldspar
(Pulverized)

Tenn. Mills—Bulk	16.00@20.00
Toughkenamon, Pa.—Color, white to light cream; 98% thru 125-150 mesh, bags, 12.00@13.00; bulk	10.00

Chicken Grits

Afton, Mich. (limestone) per ton	15.00
Belfast and Rockland, Me.—(Limestone), bulk, per ton	11.00
Centerville, Iowa (gypsum) per ton	18.00
Los Angeles Harbor (limestone), 100-lb sack, 1.00; sacks, per ton, 8.50@9.50†; bulk, per ton	6.00@7.00†
Toughkenamon, Pa.—(Feldspar) 100-lb. bags, 1.00; bulk, per ton	10.00
Danbury, Conn., Rockdale and West Stockbridge, Mass. — (Limestone) bulk	7.50@9.00*
Gypsum, Ohio.—(Gypsum) per ton	10.00
Seattle, Wash.—(Limestone), bulk, per ton	12.50

*L.C.L.
†Less than 5-ton lots.

Sand-Lime Brick

Prices given per 1000 brick f.o.b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.50
Boston, Mass	14.50
Brighton, N. Y.	*19.75
Dayton, Ohio	12.50@13.50
Detroit, Mich.	*17.50
Farmington, Conn.	16.00
Flint, Mich.	12.50@16.00
Grand Rapids, Mich.	12.00
Hartford, Conn.	*19.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.00
Madison, Wis.	12.00
Michigan City, Ind.	12.00
Milwaukee, Wis.	*13.00
Minneapolis and St. Paul, Minn.	10.00
New Brighton, Minn.	10.00
Pontiac, Mich.	13.00
Portage, Wis.	15.00
Rochester, N. Y. (del. on job)	19.75
Saginaw, Mich.	13.00
San Antonio, Texas	13.00@13.50
Sebewaing, Mich.	12.00
Syracuse, N. Y.	18.00
Terra Cotta, D. C.	13.50
Toronto, Canada	12.00
Wilkinson, Fla.-White	12.00
Buff	16.00

*Delivered on job. †Delivered in city limits.
‡Less 5%.

Portland Cement

Prices per bag and per bbl, without bags net in carload lots.

	Per Bag	Per Bbl.
Albuquerque, N. M.		3.47
Atlanta, Ga.		2.35
Baltimore, Md.		2.35
Birmingham, Ala.		2.30
Boston, Mass.		2.63
Buffalo, N. Y.		2.38
Butte, Mont.	.90¼	3.61
Cedar Rapids, Iowa		2.34
Charleston, S. C.		2.35
Cheyenne, Wyo.	.82¾	3.31
Cincinnati, Ohio		2.37
Cleveland, Ohio		2.29
Chicago, Ill.		2.10
Columbus, Ohio		2.34
Dallas, Texas	.48¾	2.15
Davenport, Iowa		2.29
Dayton, Ohio		2.38
Denver, Colo.	.66¼	2.65
Detroit, Mich.		2.05
Duluth, Minn.		2.09
Houston, Texas		2.60
Indianapolis, Ind.		2.29
Jackson, Miss.		2.60
Jacksonville, Fla.		2.50
Jersey City, N. J.		2.33
Kansas City, Mo.		2.02
Los Angeles, Calif.	.60	2.40
Louisville, Ky.		2.27
Memphis, Tenn.		2.60
Milwaukee, Wis.		2.15
Minneapolis, Minn.		2.32
Montreal, Que.		1.90
New Orleans, La.		2.40
New York, N. Y.		2.25
Norfolk, Va.		2.17
Oklahoma City, Okla.		2.56
Omaha, Neb.		2.51
Peoria, Ill.		2.27
Philadelphia, Penn.		2.41
Phoenix, Ariz.		3.70
Pittsburgh, Penn.		2.09
Portland, Colo.	.72½	2.90
Portland, Ore.		2.90
Reno, Nevada	.75¼	3.01
Richmond, Va.		2.44
Salt Lake City, Utah	.70¼	2.81
San Francisco, Calif.		2.31
Savannah, Ga.		2.50
St. Louis, Mo.	.55	2.20
St. Paul, Minn.		2.32
Seattle, Wash.	10c discount	2.65
Tampa, Fla.		2.60
Toledo, Ohio		2.20
Topeka, Kans.		2.40
Tulsa, Okla.		2.43
Wheeling, W. Va.		2.17
Winston-Salem, N. C.		2.79

NOTE—Add 40c per bbl. for bags.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.		1.85
Chattanooga, Tenn.		2.45*
Concrete, Wash.		2.35
Davenport, Calif.		2.05
Detroit, Mich.		2.15
Hannibal, Mo.		2.05
Hudson, N. Y.		2.05
Leeds, Ala.		1.95
Mildred, Kans.		2.35
Nazareth, Penn.		1.95
Northampton, Penn.		1.95
Steelton, Minn.		1.90
Toledo, Ohio		2.20
Universal, Penn.		1.85

*Including sacks at 10c each.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ¼x32x 36". Wt. 1500 lb. Per M Sq. Ft.	—Plaster Board— ⅜x32x 36". Wt. 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48". Lgths 6'-10', 1850 lb. Per M Sq. Ft.
Centerville, Iowa	2.50	12.00m	12.00m	7.00	8.00	8.50	10.00	.....	25.80	10.00	.....	.....	.....
Detroit, Mich.‡	.....	.....	.....	11.30	11.30	11.30	.....	8.00	.....	.....	.....	.....	.....
Delawanna, N. J.	.....	.....	.....	.....	.....	.....	.....	‡9.00	.....	.....	.14s	.15s	40.00
Douglas, Ariz.	.....	.....	7.00	.....	.....	15.50d	18.50	.....	30.00	15.50	.....	.....	.....
Grand Rapids, Mich.	2.75	6.00	6.00	8.00	9.00	9.00	17.50	.....	24.55	20.00	.....	.....	.....
Gypsum, Ohio‡	3.00	4.00	6.00	8.00	9.00	9.00	18.00	7.00	27.00	18.00	.....	15.00	30.00
Hanover, Mont.	.....	.....	.....	11.80	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles, Calif.	.....	.....	.....	10.30k	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Clinton, Ohio	3.00	4.00	6.00	10.00	9.00	9.00	21.00	7.00	30.15	20.00	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	12.00	13.40r	14.40r	.....	15.40r	.....	.....	.....	.....	.....	.....
Seattle, Wash.	6.70	.....	11.00	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sigurd, Utah	.....	.....	.....	.....	.....	.....	.....	.....	18.00a	.....	.....	.....	.....
Winnipeg, Man.	5.00	5.00	7.00	13.00	14.00	14.00	.....	.....	.....	.....	20.00	25.00	33.00

NOTE—Returnable bags, 10c each; paper bags, 1.00 per ton extra (not returnable).
*To 3.00; †to 11.00; ‖to 12.00; ‡prices per net ton, sacks extra; (a) to 25.00; (b) net; (c) gross.
(d) hair fibre; (f) delivered; (h) delivered in 6 states; (i) delivered on job; (k) sacks 12c extra, rebated.
(m) includes paper bags; (o) includes jute sacks; (r) including sacks at 15c; (s) per board; (t) to 16.50.

Plan Huge Merger of Cement Products Plants

PLANS for the consolidation of cement products plants throughout the United States and Canada, operating under patents controlled by the Building Units Corp., were announced recently by Charles R. Flint, a New York banker. Associated with him in the organization of the merger is Rufus Waples and Co., Philadelphia bankers.

The Building Units Patent Corp., to be entirely owned by the consolidation, was incorporated under the laws of New York January 6. It has exclusive rights to the license under the Crozier-Straub patents and will avail itself of inventions of machinery, methods and formulas acquired and to be acquired.

Besides using cinders, now a waste product, and patents on the block itself, other methods will be availed of to reduce the cost of manufacture. The plants operating under the Straub patents have an annual output of 50,000,000 cement blocks.

The new concern, to be known as the National Concrete Products Corp., it is said, will have a capital stock of about $10,000,000. It will be incorporated under the laws of Delaware. The proposed consolidation would include control of the Straub and Bo patents, covering the manufacture of cinder concrete building blocks, under which 76 patents in this country and Canada operate.

Statements of assets, liabilities and earnings have been promised or received from 33 manufacturers of cement blocks as the first stop of the proposed merger. Mr. Flint, organizer of the consolidation, said that every manufacturer will be given an opportunity to join the consolidation. When all the reports have been received from the various manufacturers definite capitalization can be set. Officers and directors of the new corporation will be elected at that time. Meanwhile, Le Roy A. Goodwin, of Camden, newly elected president of the National Cinder Block Manufacturers' Association, will be chairman of the executive committee.

Among the plants said to be included in the new corporation are the Ideal Cement Stone Co., Omaha, Neb.; St. Joseph Cinder Block Co., St. Joseph, Mo.; Moline Cast Stone Co., Davenport, Iowa; Concrete Specialties Co., Camden, N. J.; Berks Building Block Co., Reading, Penn.; Detroit Cinder Block and Tile Co., Detroit, Mich.; Cinder Block Corp., Baltimore, Md.; Lancaster Concrete Tile Co., Lancaster, Penn.; Fogel Cinder Block Co., Kansas City, Mo.; Cinder Block Corp., Denver, Colo.; Concrete Structural Unit Co., Spokane, Wash., and The Atlas Block Co., Chicago, Ill.—*Philadelphia (Penn.) Enquirer.*

Market Prices of Cement Products

Concrete Block

Prices given are net per unit, f.o.b. plant or nearest shipping point

City of shipping point	Sizes 8x8x16	8x10x16	8x12x16
Camden and Trenton, N. J	.....	.19‡	.30‡
Columbus, Ohio	.16@.18a	.....	.....
Detroit, Mich.	16.00*	.....	26.00*
Forest Park, Ill.	18.00*	23.00*	30.00*
Graettinger, Iowa	.18@.20	.....	.....
Indianapolis, Ind.	.13@.15†	.....	.....
Los Angeles, Calif.	4x3½x12—.03;	6x3½x12—.04½;	8x3½x12—.05½
Oak Park, Ill.	.18@.21a	.....	.....
Somerset, Pa.	.20@.22	.....	.....
Yakima, Wash.	20.00*	.....	.....

*Price per 100 at plant. †Rock or panel face. (a) Face. ‡ Delivered.

Cement Tile

Prices are net per sq. in carload lots, f.o.b. nearest shipping point unless otherwise stated.

Camden and Trenton, N. J.—8x12, per sq.

Red	15.00
Green	18.00
Cement City, Mich.—5"x8"x12", per M	55.00

Cicero, Ill.—Hawthorne tile, per sq.

	Chocolate Red and Orange	Yellow, Tan Green and Blue	Slate Gray
French and Spanish†	$11.50	$13.50	$12.75
Ridges	.25	.35	.30
Hips	.25	.35	.30
Hip starters	.50	.60	.60
Hip terminals, 2-way	1.25	1.50	1.50
Hip terminals, 4-way	4.25	5.00	5.00
Mansard terminals	2.50	3.00	3.00
Gable finials	1.25	1.50	1.50
Gable starters	.25	.35	.30
Gable finishers	.25	.35	.30
*End bands	.25	.35	.30
*Eave closers	.06	.08	.06
*Ridge closers	.05	.06	.05

*Used only with Spanish tile. †Price per square.

Chicago, Ill.—per sq.	20.00
Detroit, Mich., per sq.:	
5x4x12	12.00
5x8x12	20.40
Grand Rapids, Mich.:	Per 1000
5x4x12	45.00
5x8x12	70.00
5x8x 6	35.00

Graettinger, Iowa: Cement tile per 100 ft.

5-in	4.50
6-in	5.60
8-in.	9.00
10-in.	12.00
12-in.	17.50
14-in.	25.00
16-in.	35.00
18-in.	45.00
20-in.	60.00
22-in.	70.00
24-in.	80.00
30-in.	100.00

Houston, Texas.—Roofing Tile, per sq.	
Red	17.00
Green	19.50
5x4x12 (Lightweight)	45.00
5x8x12 (Lightweight)	80.00
Indianapolis, Ind.—9"x15"	
Gray	10.00
Red	11.00
Green	13.00
Longview, Wash.—(Stone Tile)	Per 1000
4x6x12	55.00
4x8x12	65.00
Mt. Pleasant, N. Y.:	Per 1000
5x8x12	78.00
Pasadena, Calif.:	Per 1000
4x4x12	$30.00
4x6x12	50.00
4x6x12	55.00

Tacoma, Wash.—Drain tile per ft.:

3 in.	.04
4 in.	.05
6 in.	.07½
8 in.	.10
Waco, Texas:	Per sq.
4x4	.60
Wildasin Spur, Los Angeles, Calif:	
4x3½x12	.03½
6x3½12	.04½
8x3½x12	.05½
Yakima, Wash.:	
5x8x12	.10

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	25.00@35.00
Baltimore, Md. (Del. according to quantity)	15.50	22.00@50.00
Camden and Trenton, N. J.	17.00	
Ensley, Ala. ("Slagtex")	14.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Longview, Wash.	18.00	25.00@75.00
Milwaukee, Wis.	15.00	25.00@75.00
Mt. Pleasant, N. Y.		14.00@23.00
Omaha, Neb.	18.00	30.00@40.00
Pasadena, Calif.	12.50	
Philadelphia, Penn.	†15.25	‡21.50
Portland, Ore.	17.00	25.00@75.00
Prairie du Chien, Wis.	14.00	22.50
Rapid City, S. D.	18.00	25.00@40.00
Waco, Texas	16.50	32.50@125.00
Watertown, N. Y.	21.00	35.00
Wauwatosa, Wis.	14.00	20.00@42.00
Winnipeg, Man.	14.00	22.00
Yakima, Wash.	22.50	.....

†Gray. ‡Red.

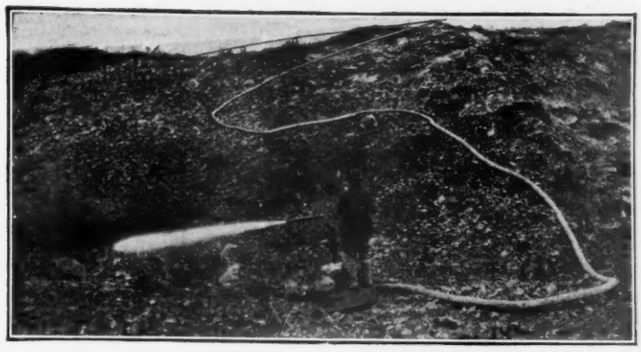
Current Prices Cement Pipe

Prices are net per foot f.o.b. cities or nearest shipping point in carload lots unless otherwise noted.

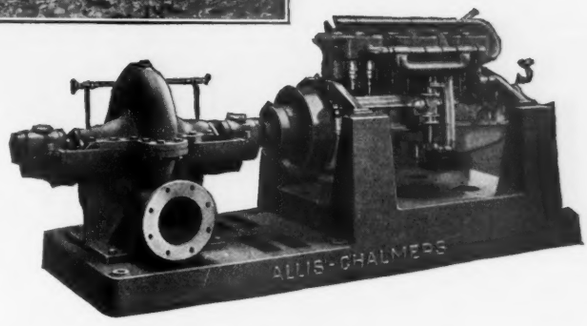
Culvert and Sewer	4 in.	6 in.	8 in.	10 in.	12 in.	15 in.	18 in.	20 in.	22 in.	24 in.	27 in.	30 in.	36 in.	42 in.	48 in.	54 in.	60 in.
Detroit, Mich.									$16.00 per ton								
Graettinger, Iowa	.04½d	.05½	.08½	.13	.17½	.....	.50	.60	.75	.85	.....	.....	.....	.....	.....	.....	.....
G'd Rapids, Mich. (b)	.....	.....	.....	.60	.72	1.00	1.28	.....	.....	1.92	2.32	3.00	4.00	.....	.....	.....	.....
Houston, Texas	.....	.19	.24	.43	.55½	.90	1.30	.....	†1.70	2.20	.....	.....	.....	.....	.....	.....	.....
Indianapolis, Ind. (a)	.....	.....	.....	.80	.90	1.10	1.30	.....	.....	1.70	.....	2.70	.....	.....	.....	.....	.....
Longview, Wash.							Sewer pipe 40% off list, culvert—list										
Mankato, Minn. (b)	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	1.75	2.50	3.25	4.25	.....	.....	.....
Mt. Pleasant, N. Y.	.....	.17	.26	.39	.50	.68	.93	1.29	.....	1.67	.....	.....	.....	.....	.....	.....	.....
Norfolk, Neb. (b)	.....	.....	.....	.90	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Paullina, Iowa‡	.....	.....	.....	.....	.....	.....	.....	2.25	.....	2.11	.....	2.75	3.58	.....	6.14	.....	7.78
Somerset, Pa.	.....	.....	.....	.....	80[1]	1.00[2]	1.40[3]	.....	.....	2.00[4]	.....	3.25[5]	4.00[6]	6.00[7]	.....	.....	.....
Tacoma, Wash.	.15	.18	.22½	.30	.40	.55	.80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tiskila, Ill. (rein.) (a)	.....	.....	.....	.65	.75	.85	1.10	1.60	.....	1.90	.....	.....	3.40	.....	.....	.....	.....
Wahoo, Neb. (b)	.....	.....	.....	.....	1.00	1.13	1.42	.....	.....	2.11	.....	2.75	3.58	4.62	6.14	6.96	7.78
Waukesha, Wis.								All sizes $9.00 per ton									
Yakima, Wash.								$10.00 per ton									

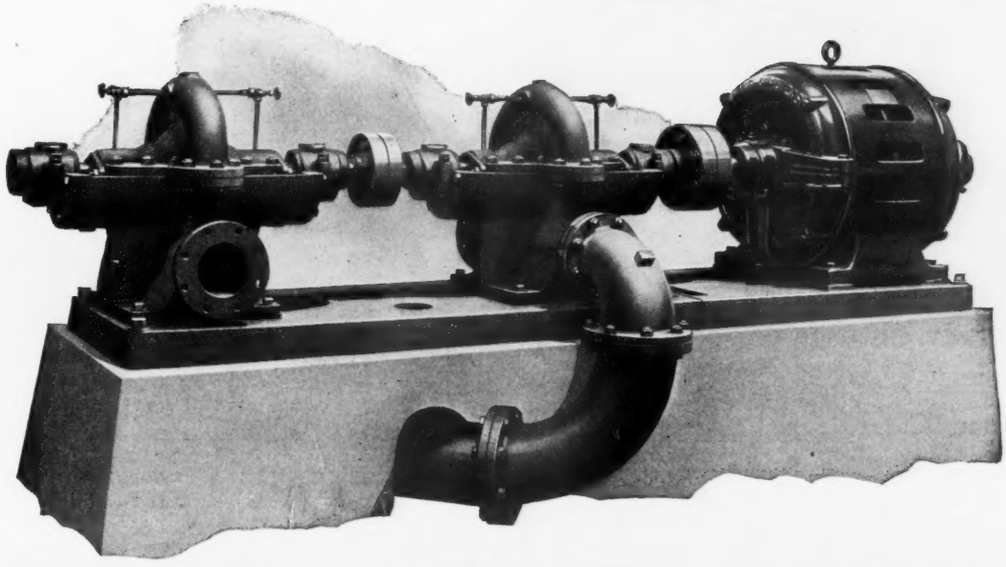
*30-in. lengths up to 27-in. diam., 48-in. lengths after; (a) 24-in. lengths; (b) Reinforced; (c) Interlocking bar reinforced. †21-in. diam. ‡Price per 2 ft. length. (d) 5 in. diam. [1]@1.08. [2]@1.25. [3]@1.65. [4]@2.50. [5]@3.85. [6]@5.00. [7]@7.50.

Centrifugal Pumping Units for The Rock Products Industry



Six Allis-Chalmers 10-in. pumps with 200 H. P. motors are successfully and economically building sand dams for the Northern New York Utilities Company; two Allis-Chalmers gasoline engine driven pumps are building an earth fill dam at Asheville, N. C., by pump sluicing. Other Allis-Chalmers pumping units are removing overburden from gravel; still others are elevating, washing and conveying gravel. Our complete line of pumps with most any kind of drive required allows us to furnish the suitable pumping unit for most any requirement in the rock products industries. Write for Bulletin 1632-G.





ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

Cement Plant To Be Built at La Salle, Illinois

THE Cowham Engineering Co., Chicago, has recently announced the erection of a 1,000,000-bbl.-per-year plant at La Salle, Ill., for the Central States Portland Cement Co.

Plan Cement Plant for Tennessee

ANNOUNCEMENT is made by officials of the Davidson, Hicks and Greene Co., pioneer hardwood lumber manufacturers of Nashville, Tenn., of their intention to immediately organize the Cumberland Portland Cement Co. for the subsequent erection of a modern plant for the manufacture of portland cement at Cowan, Tenn., under that name.

The men behind this new project are actively identified with many business interests in Tennessee, for they own and operate a large furniture factory at Nashville and coal mines at Davidson, Tenn., in addition to their extensive lumbering business.

Extensive investigations have been carried on for some time, and recently the services of the Pittsburgh Testing Laboratory were employed, who for the last two months have made thorough and expert tests of the property. The final report has been received and is said to be most favorable, they having certified as to favorableness of location, excellence of quality and supply of necessary raw materials for cement manufacture.

It is planned to erect the initial plant of about 2000 bbl. per day capacity so that additions for increasing output can be readily and easily constructed, the location being adjacent to Cowan mill property.

Organization and construction plans now under consideration will be finally determined in the near future, so that plant construction may be commenced in the early spring.

The present officers and directors of the Davidson, Hicks and Greene Co. are: W. V. Davidson, president; J. R. Greene, vice-president; H. M. Greene, secretary and treasurer; Frank Pearson, manager; N. N. Davidson and Clarence V. Hicks.—*Southern Lumberman.*

Large Cement Companies Merger Rumored

A RUMOR is circulating persistently in Denver that a closer affiliation is to be brought about between three of the largest portland cement companies in the United States, including the Ideal Cement Co. of Denver with a combined output of 22,000,000 bbl. of cement yearly. This rumor has been stimulated by the presence in New York of Claude K. Boettcher, vice-president of the Ideal Cement Co., where it is known that he has met some of the executives of the other companies.

The action of the market recently on the stocks of the Ideal Cement Co. of Denver, the Alpha Portland Cement Co. of Chicago and of Easton, Penn., and the International Cement Corp. of New York strengthens this rumor that has circulated. During the week ending February 13, Ideal Cement advanced to $85 a share, a rise of $5 since the early part of the week, and $7 above the price a month ago. Alpha Cement sold at $135, compared to $117 about a month ago, while International Cement showed great strength at $68.

Claude K. Boettcher, in addition to his connection with the Ideal Cement Co., is a member of the board of directors of the Alpha company. It is understood nothing conclusive had yet been reached, but the market indicates that good progress is being made. It is understood that Charles Boettcher, president of Ideal Cement and father of Claude K. Boettscher, is a large stockholder in Alpha Cement, and that the present negotiations were opened up through an offer from New York bankers to acquire the Boettcher shares.

The combined producing capacity of the three companies involved in the current rumor is 22,000,000 bbl. of cement yearly, of which 6,000,000 comes from Ideal plants, 7,000,000 from International plants and 9,000,000 from Alpha plants.

Ideal Cement operates through the following subsidiaries: United States Portland Cement Co. and Colorado Portland Cement Co. in Colorado; Three Forks Portland Cement Co. of Montana; Nebraska Portland Cement Co. in Nebraska; Oklahoma Portland Cement Co. in Oklahoma, and Union Portland Cement Co. in Utah. The daily capacity in Colorado is 3800 bbl. at Concrete and 2100 bbl. at Portland; in Montana, 2250 bbl. at Trident and 1000 bbl. at Hanover; in Nebraska, 2500 bbl. at Superior; in Oklahoma, 5000 bbl. at Ada, and in Utah, 2500 bbl. at Devil's Slide.

A federal court order dated December 13, 1924, requires the surrender of operations at Concrete and at one of the Montana plants within two years from that date. But the company is now building a $2,000,000 plant near Fort Collins, so that its total volume of production will not be reduced by this order, which was issued as judgment in a suit brought by the government under the Sherman anti-trust law.

International Cement's subsidiaries and the location and daily barrel capacity of its plants are as follows: Kansas Portland Cement, Bonner Springs, 3000; Texas Portland Cement, Houston, and Dallas, combined, 6000; Knickerbocker Cement, Hudson, N. Y., 4500; Virginia Portland Cement, 3000; Cuban Portland Cement, Cuba, 3000; Compania Uruaguaya de Cemento Portland, Montevideo, 1800; International Portland Cement of Argentina works at Sierras Bayas (200 miles from Buenos Aires), 3200.

Total output of the Alpha's plants is 9,000,000 bbl. yearly. They are located at St. Louis, Mo.; La Salle, Ill.; Ironton, Ohio; Bellevue , Mich.; Martins Creek, Penn.; Manheim, W. Va.; Alpha, N. J., and Cementon and Jamesville, N. Y.

Officers and directors of Ideal Cement are Charles Boettcher, president; Claude K. Boettcher, vice-president; H. C. James, vice-president and treasurer; R. J. Morse, vice-president and secretary; J. B. Grant and James Q. Newton, all of Denver; R. S. Gast, Pueblo. — *Denver (Colo.) Rocky Mountain News.*

Automatic Gravel Company to Rebuild Burned Plant

WORK of rebuilding the Automatic Gravel Products Co. plant at Muscatine, Iowa, which was almost totally destroyed by fire recently, with a loss of $40,000, is now under way, and it is expected that the washing plant will be in operation within a short time.

The first repairs are being made on the washing plant, the southern end of which was destroyed, after which work will be started on the screening plant, which was entirely burned. The washing plant will be completed first, because the company will be able to furnish gravel without the aid of the screening buildings.—*Muscatine (Iowa) Journal.*

New "Stone-Tile" Plant Starts Operation in Texas

ANNOUNCEMENT was made recently of the closing of a contract between the National Stone-Tile Corp. and the Turner Gravel Co., whereby the San Antonio company will start the manufacture of artificial stone building units.

Equipment for turning out quantity production has been installed with plans for starting deliveries of the new product within a short time.

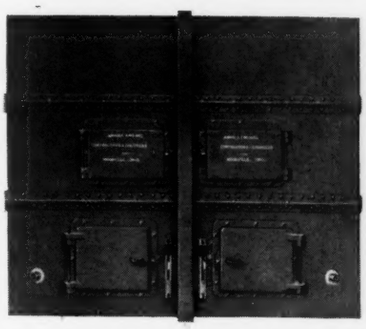
Arrangements for distribution of the new product and for financing buildings of that material have been made with the big building material distributors of San Antonio.

The new plant is open for the inspection of the public and a technical expert will be kept on duty at the plant to act as guide to visitors.—*San Antonio (Tex.) Express.*

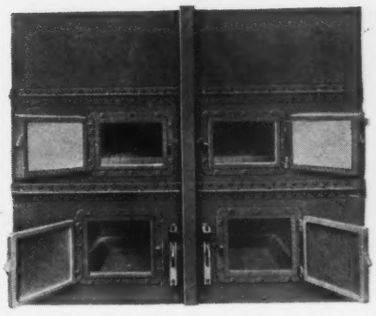
Middlebury Quarry in Successful Operation

THE Middlebury white marble quarry at Middlebury, Vt., which was taken over by the Brandon Rock Products Corp. early in 1925, has contracted to deliver its entire output to the Chicago Terrazzo and Mosaic Contractors' Association. Since the Brandon company took the quarry over its production has been increased twice and at present operations are carried on for 21 hours per day in two shifts to supply the demand for aggregate. The quarry has been in operation for 31 years and only under its present owners has it been so successful.—*Burlington (Vt.) News.*

"The Standard of the Lime Industry"



Doors Closed



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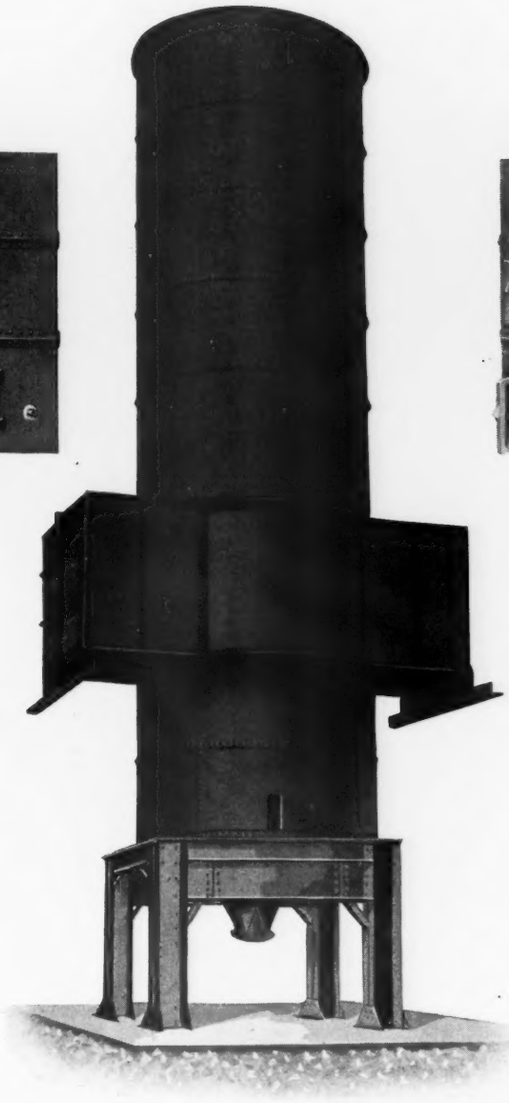


Complete Engineering and Construction Service Tests and Analyses

Manufacturers of

The "Arnold" Kiln
The "Weber" Hydrator
A. & W. Pneumatic Draw Shears

ARNOLD & WEIGEL

Contractors and Engineers

WOODVILLE, OHIO, U. S. A.

Cement Plant To Be Built at La Salle, Illinois

THE Cowham Engineering Co., Chicago, has recently announced the erection of a 1,000,000-bbl.-per-year plant at La Salle, Ill., for the Central States Portland Cement Co.

Plan Cement Plant for Tennessee

ANNOUNCEMENT is made by officials of the Davidson, Hicks and Greene Co., pioneer hardwood lumber manufacturers of Nashville, Tenn., of their intention to immediately organize the Cumberland Portland Cement Co. for the subsequent erection of a modern plant for the manufacture of portland cement at Cowan, Tenn., under that name.

The men behind this new project are actively identified with many business interests in Tennessee, for they own and operate a large furniture factory at Nashville and coal mines at Davidson, Tenn., in addition to their extensive lumbering business.

Extensive investigations have been carried on for some time, and recently the services of the Pittsburgh Testing Laboratory were employed, who for the last two months have made thorough and expert tests of the property. The final report has been received and is said to be most favorable, they having certified as to favorableness of location, excellence of quality and supply of necessary raw materials for cement manufacture.

It is planned to erect the initial plant of about 2000 bbl. per day capacity so that additions for increasing output can be readily and easily constructed, the location being adjacent to Cowan mill property.

Organization and construction plans now under consideration will be finally determined in the near future, so that plant construction may be commenced in the early spring.

The present officers and directors of the Davidson, Hicks and Greene Co. are: W. V. Davidson, president; J. R. Greene, vice-president; H. M. Greene, secretary and treasurer; Frank Pearson, manager; N. N. Davidson and Clarence V. Hicks.—*Southern Lumberman.*

Large Cement Companies Merger Rumored

A RUMOR is circulating persistently in Denver that a closer affiliation is to be brought about between three of the largest portland cement companies in the United States, including the Ideal Cement Co. of Denver with a combined output of 22,000,000 bbl. of cement yearly. This rumor has been stimulated by the presence in New York of Claude K. Boettcher, vice-president of the Ideal Cement Co., where it is known that he has met some of the executives of the other companies.

The action of the market recently on the stocks of the Ideal Cement Co. of Denver, the Alpha Portland Cement Co. of Chicago and of Easton, Penn., and the International Cement Corp. of New York strengthens this rumor that has circulated. During the week ending February 13, Ideal Cement advanced to $85 a share, a rise of $5 since the early part of the week, and $7 above the price a month ago. Alpha Cement sold at $135, compared to $117 about a month ago, while International Cement showed great strength at $68.

Claude K. Boettcher, in addition to his connection with the Ideal Cement Co., is a member of the board of directors of the Alpha company. It is understood nothing conclusive had yet been reached, but the market indicates that good progress is being made. It is understood that Charles Boettcher, president of Ideal Cement and father of Claude K. Boettscher, is a large stockholder in Alpha Cement, and that the present negotiations were opened up through an offer from New York bankers to acquire the Boettcher shares.

The combined producing capacity of the three companies involved in the current rumor is 22,000,000 bbl. of cement yearly, of which 6,000,000 comes from Ideal plants, 7,000,000 from International plants and 9,000,000 from Alpha plants.

Ideal Cement operates through the following subsidiaries: United States Portland Cement Co. and Colorado Portland Cement Co. in Colorado; Three Forks Portland Cement Co. of Montana; Nebraska Portland Cement Co. in Nebraska; Oklahoma Portland Cement Co. in Oklahoma, and Union Portland Cement Co. in Utah. The daily capacity in Colorado is 3800 bbl. at Concrete and 2100 bbl. at Portland; in Montana, 2250 bbl. at Trident and 1000 bbl. at Hanover; in Nebraska, 2500 bbl. at Superior; in Oklahoma, 5000 bbl. at Ada, and in Utah, 2500 bbl. at Devil's Slide.

A federal court order dated December 13, 1924, requires the surrender of operations at Concrete and at one of the Montana plants within two years from that date. But the company is now building a $2,000,000 plant near Fort Collins, so that its total volume of production will not be reduced by this order, which was issued as judgment in a suit brought by the government under the Sherman anti-trust law.

International Cement's subsidiaries and the location and daily barrel capacity of its plants are as follows: Kansas Portland Cement, Bonner Springs, 3000; Texas Portland Cement, Houston, and Dallas, combined, 6000; Knickerbocker Cement, Hudson, N. Y., 4500; Virginia Portland Cement, 3000; Cuban Portland Cement, Cuba, 3000; Compania Uruaguaya de Cemento Portland, Montevideo, 1800; International Portland Cement of Argentina works at Sierras Bayas (200 miles from Buenos Aires), 3200.

Total output of the Alpha's plants is 9,000,000 bbl. yearly. They are located at St. Louis, Mo.; La Salle, Ill.; Ironton, Ohio; Bellevue, Mich.; Martins Creek, Penn.; Manheim, W. Va.; Alpha, N. J., and Cementon and Jamesville, N. Y.

Officers and directors of Ideal Cement are Charles Boettcher, president; Claude K. Boettcher, vice-president; H. C. James, vice-president and treasurer; R. J. Morse, vice-president and secretary; J. B. Grant and James Q. Newton, all of Denver; R. S. Gast, Pueblo. — *Denver (Colo.) Rocky Mountain News.*

Automatic Gravel Company to Rebuild Burned Plant

WORK of rebuilding the Automatic Gravel Products Co. plant at Muscatine, Iowa, which was almost totally destroyed by fire recently, with a loss of $40,000, is now under way, and it is expected that the washing plant will be in operation within a short time.

The first repairs are being made on the washing plant, the southern end of which was destroyed, after which work will be started on the screening plant, which was entirely burned. The washing plant will be completed first, because the company will be able to furnish gravel without the aid of the screening buildings.—*Muscatine (Iowa) Journal.*

New "Stone-Tile" Plant Starts Operation in Texas

ANNOUNCEMENT was made recently of the closing of a contract between the National Stone-Tile Corp. and the Turner Gravel Co., whereby the San Antonio company will start the manufacture of artificial stone building units.

Equipment for turning out quantity production has been installed with plans for starting deliveries of the new product within a short time.

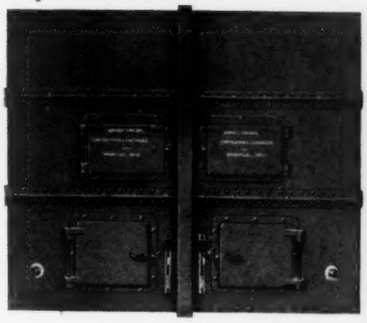
Arrangements for distribution of the new product and for financing buildings of that material have been made with the big building material distributors of San Antonio.

The new plant is open for the inspection of the public and a technical expert will be kept on duty at the plant to act as guide to visitors.—*San Antonio (Tex.) Express.*

Middlebury Quarry in Successful Operation

THE Middlebury white marble quarry at Middlebury, Vt., which was taken over by the Brandon Rock Products Corp. early in 1925, has contracted to deliver its entire output to the Chicago Terrazzo and Mosaic Contractors' Association. Since the Brandon company took the quarry over its production has been increased twice and at present operations are carried on for 21 hours per day in two shifts to supply the demand for aggregate. The quarry has been in operation for 31 years and only under its present owners has it been so successful.—*Burlington (Vt.) News.*

"The Standard of the Lime Industry"



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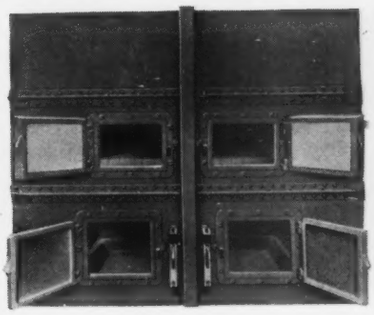

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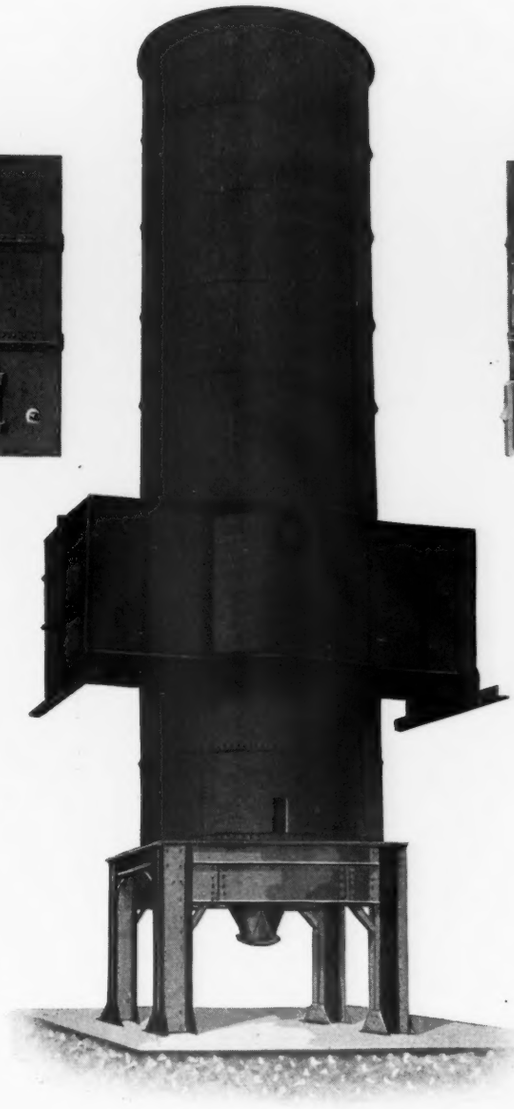

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News of All the Industry

Incorporations

Houghland and Hardy Co., Evansville, Ind. Increased capital stock to $50,000.

Tri-Cities Stone Co., Inc., Davenport, Ia., $50,000. Edward N. Welch and others.

Architectural Cast Stone Co., St. Petersburg, Fla., G. Zampol, J. S. Glenn and others.

West Coast Granite and Marble Co., Tampa, Fla. J. L. Reed, Jr., Sivaun St., Tampa.

Florida-Cuba Stone Co., Inc., St. Petersburg, Fla., $10,000. J. Ellis, I. Talley and others.

Florida Concrete Products Co., Ojus, Fla., $60,000. E. J. Stein, N. K. Feldman and others.

Genesee Gravel Co., Detroit, Mich., has increased its capital stock from $50,000 to $75,000.

Daytona Beach Stone Tile Co., Daytona Beach, Fla., $50,000. F. J. Raymond, R. H. Ennis and others.

Williston Shell Rock Co., Williston, Fla. C. T. Perry, Ocala; W. H. Langston, Orlando, and others.

Penn Limestone Co., Inc., Wilmington, Del., $100,000. (F. L. Mettler, Wilmington). To crush limestone, etc.

Lincoln Gravel Co., Star City, Ark., $10,000. M. E. Sherland, A. J. Johnson, C. E. Fish and James McClellan.

Southwestern Stucco Co., Ponca City, Okla., $150,000. J. W. Wagner, M. B. Shires and Lee Dunham, all of Ponca City.

St. Joe Lime and Stone Co., St. Joe, Ark., $200,000. Incorporated at Dover, Del. To manufacture lime and lime products.

Ponca City Rock and Sand Co., Ponca City, Okla., $10,000. A. L. Borgan, William Brantingham and A. E. Warren, all of Ponca City.

Troy Stone Co., Troy, N. Y., 500 shares of no par value. George C. and Ethel C. Marcus, Charles Cantor, all of Poughkeepsie, N. Y.

Summit Limestone Products Co., Pittsfield, Mass., 1000 shares no par value. Edmund Putnam, William T. Nesbitt, Jr., Pittsfield, and Nelson E. Wright.

Apex Concrete Co., New York, N. Y., $7,500. A. de Paolo, A. Savastano, T. Lanzara. (Attys., Liebman, Blumenthal & Levy, 346 West 44th St., New York.)

Buffalo Wash Tray Works, Tonawanda, N. Y., $150,000. M. J. Blanchard, S. L. Schanzer and others. (Atty., J. E. Barr, Buffalo). To manufacture cement products.

Quarries

A. T. Thomas of Ocala and **F. J. Rooks** of Williston, Fla., will develop new quarry, to be in operation within a short time.

Union Rock Co., Los Angeles, Calif., is about to begin construction of storage and distributing bunkers at 4816 Pico Blvd., to cost about $35,000.

Lithonia Granite Co., Lithonia, Ga., will install a crusher and other machinery to work a deposit at Collinsville Mountain. W. T. Hurst of Cleveland, Ohio, is president.

Kaiser Paving Co., Oakland, Calif., is planning to double the capacity of their crushing plant at Black Butte, Calif., in order to fill contracts for materials for the South Pacific railroad.

A. F. Fisher, Houston, Texas, is reported to be planning the erection of a 500-ton per day crushing plant at Callado, Texas. The plant proper will be able to handle 1000 tons per day and with trackage, etc., will cost about $200,000.

John W. Peters, Burlington, Wis., is planning improvements at his plant to cost about $20,000. Side tracks will be built and bins with a 350 yd. capacity put in. He will also install machinery for the manufacture of cement block and other cement products.

Ponca City Rock, Sand and Gravel Co., Ponca City, Okla., is to install new equipment to increase capacity from 100 to 150 cu. yd. per day of crushed rock. A. L. Bogan, who has recently purchased a half interest in the company will take over the management.

Sand and Gravel

Ladwig Sand and Gravel Co., Milwaukee, Wis., have purchased a 60-acre gravel pit at Thiensville, Wis., for a reported price of $60,000.

Nickum Kelly Sand and Gravel Co., Portland, Ore., have awarded contract for the erection of a sand and gravel bunker at their plant at a cost of $22,000.

General Sand and Supply Co., Pittsburgh, Penn., has construction under way on a new sand and gravel plant at Wellsville, Ohio, where an 8-acre tract has been acquired on the Ohio river waterfront. Complete loading, conveying and handling equipment will be installed. The plant will cost close to $200,000 with site. Part of the proceeds of $260,000 of preferred stock issued will be used for the new construction.

Cement

Carolina Portland Cement Co., Jacksonville, Fla., warehouse and offices were damaged through recent fire.

Giant Portland Cement Co., Coplay, Penn., is making alterations and improvements in its Reliance mill, to include machinery replacements and repairs and the installation of additional equipment.

Cement Products

Benson Cement Products Co., Atlanta, Ga., is reported to be planning the erection of a plant at Tampa, Fla.

Erickson Concrete Products Co., is making plans for rebuilding of its business building in Waseca, Minn., which was recently burned.

E. E. McCormick has engaged in business in Portland, Ore., as the McCormick Concrete Co., and will manufacture cement products.

J. Eastman has engaged in the manufacture of stucco products at 8916 Santa Monica Blvd., Sherman, Calif., as the J. Eastman Manufacturing Co.

Keeling-Cassidy Brick Co., Atlanta, Ga., will establish a plant on the Southern Railway belt line near Forest Extension, for the manufacture of concrete brick and tile.

Tekoppel Block Co., Evansville, Ind., has been dissolved to make way for the proposed development of the plant under the single ownership of John Tekoppel. Mr. Tekoppel purchased the shares of Tobias Thayer and Frank Folz, who were associated with him in the old company. The present capacity of 1000 block per day will be increased and additions made to the plant which will provide salesrooms for a line of building materials to be retailed.

Lime

Valley Lime Corp.'s new plant near Roscoe, Calif, is rapidly nearing completion and is expected to start shipments of high calcium lime within a short time.

Gypsum

American Gypsum Co., Ft. Clinton, Ohio, at its annual election chose the following officers and directors for 1926: President, A. H. McGrady, F. J. Griswold, vice-president and general manager; J. B. Davis, secretary-treasurer. The other members of the board of directors are P. K. Tadsen, Port Clinton; Charles Miller, Cleveland; Ed McCrady, Braddock, Penn., and Harry Beens, Pittsburgh.

Slag

Buffalo Slag Co., Buffalo, N. Y., has completed plans for the erection of a slag plant at Erie, Penn., to replace the one recently burned.

Miscellaneous Rock Products

Krystal Rock Stucco Co., Columbus, Ohio, has preliminary plans under consideration for the erection of an addition to their plant at New Bremen, Ohio, to cost about $40,000 with equipment.

Personal

James A. Farley, formerly eastern sales manager for the Universal Gypsum Co. of Chicago, and long connected with the gypsum industry, has engaged in the retail building supply business under the name of the James A. Farley Co. at 63rd St. and East river, New York City.

Obituary

George T. Egbert, president of the Egbert Concrete Products Co., Brooklyn, N. Y., died recently at his home on Staten Island, N. Y. He was for over 20 years secretary to the Borough of Richmond and prominent in public affairs at that place. His funeral was attended by many public officials and representatives of the many orders of which he was a member. As a tribute to his memory all flags on public buildings on Staten Island will remain at half staff for 30 days.

Manufacturers

American Steel and Wire Co., Chicago, Ill., has appointed **H. S. Durant**, manager of the Cold Roll Strip and Spring Sales department vice Lewis Johnson, deceased.

Foote Bros. Gear and Machine Co., Chicago, Ill., announces the appointment of R. J. Beler as assistant to W. G. Kerr, district representative at the Pittsburgh, Penn., sales office.

Foote Bros. Gear and Machine Co., Chicago, Ill., announce the appointment of H. H. Snell, formerly manager of the gear department for Chas. Bond Co., Philadelphia, as district representative.

Osgood Co., Marion, Ohio, has recently published a 4-page rotogravure section in which are shown many views of Marion shovels, cranes and draglines in use on different jobs throughout the country.

Celite Products Co. announces the removal of its San Francisco office from the Monadnock Building to 140 Spear St., San Francisco. This change is made to provide larger quarters and better operating facilities.

MacDonald Engineering Co., Chicago, Ill., announce the appointment of Howard . Griffin as negotiating engineer to the Spencer Construction Co. of Baltimore, Md., which is the eastern division of the MacDonald company.

Bates Valve Bag Co., Chicago, Ill., are rapidly completing their new plant at Nazareth, Penn. The present factory has been sold and the equipment will be moved soon to the new factory which will manufacture bag filling machinery, bags, etc.

Dayton-Whirley Co., Dayton, Ohio, has been incorporated with a nominal capitalization of $500 to manufacture the Whirley excavating machine. The manufacture of this excavator has been heretofore been on contract and it is expected that production will be increased.

Orton and Steinbrenner Co., Chicago, Ill., have changed their corporate name to the Orton Crane and Shovel Co. of the same address. No change in management or ownership is involved; the change in name being to describe better the company's principal activities and products.

The John S. King Co., Cleveland advertising agency, recently held its annual meeting and elected the following officers: J. S. King, president; C. A. Brinkman, first vice-president; K. L. Ede, second vice-president; John E. Wiley, secretary; and Edward King, treasurer. The company reported a successful year and a considerable growth of business.